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ABSTRACT

This monograph presents extensive abstracts of 49 papers on developmental approaches to identifying exceptional ability. Sample topics include: the gifted population in prison; identification of gifted rural children; use of the Stanford-Binet for identification; student characteristics and placement into special programs for the highly gifted; identification of culturally diverse students; longitudinal development of the intellectually gifted; cognitive style of gifted preschoolers; eidetic imagery; development of problem finding ability in gifted students; quantitative electrophysiology and behavior of gifted and talented children; identification of mathematically talented elementary students; the development of aesthetic experience; programs for underserved pupils; applying the theory of multiple intelligences; giftedness in the multi-age multi-ability primary school; and creativity tests and artistic talent. (DB)

Second Annual

Esther Katz Rosen Symposium on the Psychological Development of Gifted Children

Developmental Approaches to Identifying Exceptional Ability

Abstracts of Selected Papers

University of Kansas
Lawrence, Kansas
February 28 - 29, 1992

GIFTED BEHIND PRISON WALLS

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There has been an increase in the amount of attention being paid to dropouts who presently represent the largest percentage of juvenile prison population. In view of this large representation we should be asking "What abilities have we lost to society; are there able learners among this population?"

In addition to the question asked above another contribution to the literature on education of the gifted would be additional data on the approximate percentage of gifted individuals that can be found among dropouts.

The population for this study was 107 youthful offenders ages 12-17 who were in prison in a northeastern state.

The research questions of this study were as follows:

1. Are there gifted students among this population?

2. Were there differences in scores from institution to institution?

3. What were the correlations between the math and reading scores of the Woodcock Johnson test and the Ravens Matrix scores?

The Raven Progressive Matrices Standard form was used to test students. Data for the study was collected on 104 of the original group. The results indicated that 13% of the students ranked within the Ravens listing of high ability. There were differences in the scores from the various institutions and correlations between the math and reading scores could not be assessed since all of the students did not have appropriate scores on these tests.

There will be a discussion of the implications of this study and recommendations for further study.

Preservice teachers' conceptions of ability:
Exploring the nature and origins of contrasting views

This paper presents quantitative and qualitative data regarding preservice teachers' conceptions of ability. The study defines conceptions of ability in several ways. A four-point Likert scale questionnaire was designed to assess preservice teachers' relative agreement with various descriptions of ability and intelligence. For example, subjects were asked if they considered intelligence to be a general, global trait or a trait comprised of several, independent or inter-dependent abilities. Subjects were also asked whether abilities such as artistic ability or social competence were included within their personal definitions of intelligence.

In addition to describing their views regarding the composite nature of intelligence, subjects indicated their views regarding the relative stability of intelligence over the lifespan and their perceptions of the relationship between ability and effort in determining academic achievement. The questionnaire was administered to two hundred and seventy preservice teachers in three colleges: one large, urban, public research university, one medium sized, public historically black college, and one rural, private Appalachian college.

The data from the questionnaire were analyzed and revealed several significant differences among the subjects from the three institutions. For example, on average, the subjects from the historically black college were more likely to include social competencies in their personal definitions of intelligence. Also, the subjects from the Appalachian college were more likely to include artistic abilities in their definitions of intelligence. Four representative subjects were selected from each institution for follow-up interviews. The questionnaire responses of these subjects reflected the trends of their particular institution. The purpose of the follow-up interviews was to elaborate upon subjects' questionnaire responses and to elicit from subjects their views regarding the experiential origins of their conceptions of intelligence and abilities. These interview data provide insight into the nature and origins of subjects' conceptions of ability and intelligence including sociocultural variations.

A final focus of this study was the relationship between preservice teachers' conceptions of ability and intelligence and their preferences for structuring classroom learning as prospective teachers. Surprisingly, there was little relationship between subjects' conceptions of ability and intelligence and their preferences for a variety of teaching practices. It is suggested that preservice teachers' conceptions of ability reflect greater variety than their familiarity with different approaches to teaching.

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THE TEXAS IDENTIFICATION SCALE FOR RURAL GIFTED CHILDREN

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The difficulty in identifying the gifted from within the disadvantaged populations is a well-documented fact (Torrance, 1975; Baldwin, 1978; Mercer, 1978; Barbe & Frierson, 1975; Hunter & Lowe, 1978; Renzulli, 1977; Sato, 1974; Ryan, 1983; Fleming, 1980; and Walker, Davis, and Givhan, 1981). Some of these have investigated uses of traditional individual intelligence tests with accompanying factors of socioeconomic indicators, matrices, and teacher and peer nominations. Also different types of indicators of potential such as creativity tests have been used in attempting to identify these students. No one proven method has emerged as the best, perhaps due to the lack of continued research in the area, or to the failure to synthesize research that is already available. When considering the qualifier, rural, in combination with disadvantaged, the major concern in identification is that specific studies on "rural disadvantaged," appear to have been generated as by-products of basic research on disadvantaged populations who happen to be geographically isolated. In addition, much of the research has not focused on defining or isolating characteristics of the rural gifted. Up to this point, educators have defined in a generic, eclectic sense "the rural, disadvantaged gifted" through a syntheses of isolated definitions; however, no empirical evidence has been available to support the current operational definition of rural gifted. Hoge (1988) suggests that deficiencies in identification procedures are due, in part, to construct failure of fully-developed definitions. He further states that we need to be able to have a defense for the decisions on placement of children in gifted programs in terms of "concrete statements of the traits, aptitudes, or behaviors" (p. 14). In other words, Hoge is suggesting that we do not even have a supportive definition of just who the gifted in general are at this time.

Hoge (1988) reviewed a number of theoretical and empirical research efforts underway which are encouraging in the development of a general giftedness construct (Hagen, 1980; Sternberg, 1982; 1986; Sternberg & Davidson, 1983; Sternberg & Powell, 1983; Jackson & Breimiller, 1985; Jackson & Cleland, 1984; Jackson & Myers, 1982; Feldhuson, 1986; Gagne, 1985; Rabinowitz & Glaser, 1985; and Renzulli, 1986). The Texas Identification Scale for Rural Gifted Children develops a more accurate definition of the rural gifted child through the development of an identification scale for rural gifted children (Davis, Henderson, McDurmott, & Pugh, 1989, 1990). The Texas Scale followed the Renzulli Scale's model in the structure of the teacher rating scale. It focuses on specific characteristics that are common to rurally isolated individuals, and supports Kirk's (1966) finding which determined that teachers assess more accurately specific abilities rather than estimating overall ability. The Texas Identification Scale for Rural Gifted Children includes twenty-eight items that require the teacher to rate according to a five point Likert-type scale. The total point spread ranges from 0 to 140 possible points.

THE DEVELOPMENT OF TWO SHORT FORMS OF INTELLIGENCE TESTS FOR GIFTED STUDENTS

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In the past, short forms of the Wechsler Intelligence Test for Children - Revised (WISC-R) and the Standard-Binet, Fourth Edition (SB:FE) have dealt with samples of average (Wight & Sandry, 1962; Delaney & Hopkins, 1987) and subaverage students (Carleton & Stacey, 1954; Cole, Williams, Nix, & Litaker, 1967; Delaney & Hopkins, 1987). Two short forms of the WISC-R have been developed specifically for screening purposes in the placement of gifted children (Killan & Hughes, 1978; Karnes & Brown, 1981); however, there is no evidence of the development of short forms of gifted screening purposes utilizing SB:FE or the WISC-III (the most recent revision of the WISC-R).

Khatena (1982) and Clark (1988) have reviewed extensive literature which indicates that group intelligence tests underscreen gifted students when used as a part of a screening battery. A 1987 study of state directors of programs for the gifted indicated that 17 states require individual intelligence tests and 23 other states recommend the use of individual intelligence tests for gifted program placement (Houseman, 1987). Although the individually administered intelligence test is considered a better identifier of gifted (Sattler, 1988) than the group intelligence test and although 80 percent of the states either require or recommend an individually administered intelligence test, the WISC-III and the SB:FE are too time and cost prohibitive for most districts to consider either in the gifted child child screening. School psychologists, diagnosticians, and specialists who work with gifted children could utilize short forms of each of these tests resulting in more accurate identification of the gifted.

It is the responsibility of the professional community, not the test publishers or authors, to evaluate the usefulness of a test with a special population. To date minimal literature exists relative to the use of the SB:FE to identify giftedness and no literature exists relative to The WISC-III.

The current research is developing a short form of the WISC-R and the SB:FE to identify the intellectually gifted. Correlations will be obtained between the WISC-III and the SB:FE short forms and the full test batteries. Each full test battery has 12-13 subtests, this research will develop and standardize a battery os six subtests or less for each test. Additionally, a correlation of these short forms will be established between the WISC-III, the SB:FE, and the Texas identification Scale for Rural Gifted Children (Texas Scale) (Davis, Henderson, McDurmott, & Pugh, 1990).

The results of this research will provide a base for model identification procedures in gifted education. Findings will be translated and disseminated for practical use nationwide. This research has the potential to affect gifted identification procedures in virtually every school district throughout

the country. This will be the FIRST investigation utilizing the two major intelligence tests, the WISC-III and the SB:FE, in the development of correlations and short forms among the gifted population. The significant result from the research will be a time efficient and cost efficient means of identifying gifted children without sacrificing accuracy in the process.

CRITICAL REVIEW OF LITERATURE ON THE USE OF THE STANFORD-BINET: FOURTH EDITION FOR THE IDENTIFICATION OF GIFTED CHILDREN

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The 1986 release of Stanford-Binet: Fourth Edition (SB:FE) by Thorndike, Hagen, and Sattler generated much controversy. The SB:FE introduced a novel approach to the evaluation of cognitive abilities with its utilization of a three-level heirarchical model.

The authors of the Stanford-Binet: Fourth Edition ascribe to the notion of "g" as the theoretical construct best to describe the intelligence. "g" is defined as the cognitive assembly and control processes that an individual uses to organize adaptive strategies for solving novel problems (Thorndike, Hagen, & Sattler, 1986). Contributing to "g" are three broad factors: Crystallized abilities, fluid-analytic abilities, and short term memory.

According to the test authors, the crystallized ability factor represents the cognitive skills necessary for acquiring and using information about verbal and quantitative concepts to solve problems. The fluid-analytic abilities factor is defined as the cognitive skills necessary for solving new problems that involve figural or other non-verbal stimuli. Short-term memory has been identified as having two functions: 1) to retain newly perceived information temporarily until it can be stored in the long term memory, and 2) to hold information drawn from long-term memory that is being used for an ongoing task.

The third level of the SB:FE is more content dependent and includes verbal reasoning, quantitative reasoning, abstract-visual reasoning and short-term memory. The test authors have suggested that research may yield additional factors on this level.

Thorndike, Hagen, and Sattler recommended the SB:FE for the identification of gifted students. An abbreviated battery that discriminates effectively among the top 10 to 15 percent of individuals at each age level has been suggested. It includes the tests which are less subject to ceiling effects. Scores derived from the SB:FE describe not only the level of cognitive ability but also the pattern of cognitive abilities (Delaney & Hopkins, 1987). The use of the SB:FE is not limited to identification but may also have utility in instructional planning.

Numerous authors (Slate, 1986; McCallum, 1988; McCall, 1989) have discussed data from factor analytic studies, concurrent validity studies, and other correlational studies. The data suggest use of the test to identify gifted students and support the test model of cognitive abilities. Further delineation of these and other research findings will be reviewed at the presentation. The presentation will also address the structural characteristics of the Stanford-Binet: Fourth Edition which make it an appropriate tool for identifying gifted students.

INTERRELATIONSHIPS BETWEEN PRESCHOOL ATTENDANCE, PARENT EDUCATION, PARENTAL EXPECTATIONS AND BEHAVIORS, AND CHILD BEHAVIORS AND ATTRIBUTES

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Over the past decade, findings from an ongoing longitudinal study with randomly assigned experimental and control groups have demonstrated preschool and parent education effects on social competency favoring children in the participating groups. A current wave of the larger longitudinal study was specifically designed to delineate the direct and indirect effects of preschool attendance and parent education on parental expectations, parental reading behaviors, child listening behaviors, and the child attributes of self-esteem and social competence. The design of the study reflects the need to better understand how program effects are mediated and achieve efficacy (Horowitz & O'Brien, 1989).

Seventy-three preschool children and their parents served as subjects. All of the families had both parents present in the home. The families were ethnically diverse, though the majority were anglos. Most of the families were above the regional average in income, had parents who had attended at least some college, and participated regularly in religious services. As a group of children would be considered healthy, well adjusted, and intelligent (average IQ = 125).

Parental expectations were measured using the Educational Attitude Scale (Rescorla, Hirsh-Pasek, Hyson, & Cone, 1988). This measure yields information about parents expectations for their children in the areas of academics, social skills, aesthetics, and sports.

Parent reading behaviors and child listening behaviors were noted during a videotaped reading task (Whitehurst, Falco, Lonigan, Fischel, DeBaryshe, Valdez-Menchaca & Caulfield, 1988). This measure yielded information about five behaviors exhibited by parents interacting with their children: Reading/conversation, asking simple questions, asking complex questions, making requests, and praising.

The Whitehurst, et. al. (1988), measure was modified and adapted to yield information about five behaviors exhibited by preschool children interacting with their parents: Conversation, asking simple questions, asking complex questions, making requests, and criticizing.

In addition, interview and observational measures were used to assess the children's self-esteem (Larsen & Leigh, 1977) and social competence (Levine, Elzey, & Lewis, 1969).

A series of multiple regression analyses indicated that there were both positive and negative effects flowing from the preschool and parent education experiences through parental expectations and behaviors to the child behaviors and attributes (See Figure). The parent education experience increased all

four parental expectations as well as the number of requests parents made of their children. Increased expectations were advantageous to the preschool children in that high academic expectations were associated with high child self-esteem and high social expectations were associated with high social competence. The positive effects of high parental academic and social expectations support the observations of Stevenson and Lee (1990).

However, increased parental expectations also had a negative side. High expectations in sports, the arts, and social skills appear to have suppressed some of the supportive behaviors exhibited by parents during the reading task. This observation is consistent with the view that increased expectations may lead some parents to do less rather than more for their children (Elkind, 1981). The view that the suppression of parental supportive behaviors is negative is strengthened by the chain of positive relationships leading from the parent suppressed reading behaviors to the child listening behaviors (See Figure).

Preschool attendance tended to suppress parent's academic and social expectations for their children, parental praise behavior, and the child's self-esteem. These findings are at variance with the typical sanguine view of preschools' effects and are in need of replication and further investigation. One explanation of these discrepant findings may lie with the atypical nature of the present sample. Positive program effects may be more easily observed when the children studied are under more severe stress than would be typical of the present sample. Another view is that when educationally oriented parents have the opportunity to see their child in the context of other children from advantaged settings they mistakenly lower their expectations. Similarly, capable children who find themselves in a program with highly competent peers may make a downward adjustment in their view of themselves.

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EXPLORATION OF SALIENT STUDENT CHARACTERISTICS INVOLVED IN COMMITTEE DECISION MAKING REGARDING PLACEMENT OF CHILDREN INTO SPECIALIZED PROGRAMS FOR THE HIGHLY GIFTED

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The present study investigated issues in collective identification of gifted children. Emphasis was placed on ascertaining which factors were most salient and selection of students for specialized programs. Predictive validity was addressed by looking at whether the selection criteria predicted subsequent performance in the program relative to peers. The nature and degree of interrelatedness among the indicators of giftedness were considered. A final analysis explored the incremental validity of using a multiple criteria predictor set over a single criteria.

Subjects were 604 third grade students who had passed the first two phases of screening for a specialized program, and were recommended for more specific screening. A 19 variable predictor set included scores on intelligence, creativity and achievement tests as well as teacher and school recommendations.

Discriminant analysis yielded a statistically significant discriminant function which effectively separated students in the selected group from those in the nonselected group. The WISC-R Full Scale score emerged as the single most dominant component of this function. Similarly, multiple regression analysis performed on the trichotomized data resulted in an equation that significantly predicted group membership.

Multiple regression analyses were also performed to address predictive validity issues. The overall regression equation was not significant, indicating that the set of selection criteria, as a whole, did not significantly predict evaluation of relative performance issues related to the impact of reduced power and restriction of range were discussed in this context.

Exploratory factor analysis was performed to illuminate common dimensions among measures. The most parsimonious explanatory factor solution involved three factors which were labeled "rating factor," "WISC-Rg factor," and "abstract reasoning."

Ordered regression analyses were conducted to address issues of incremental validity. Results indicated that neither the WISC-R nor the other predictors, as a group, were significant in predicting relative performance in the program. Three of the variables, however, when entered alone or after the WISC-R, were significant.

Additional ordered regression analyses were conducted entering only these three significant variables into the regression equation. Results indicated that each of these variables, when entered before the subset of the other two variables, was significant.

Implications for future research and practice were discussed.

THE PREVALENCE AND POLYVALENCE OF APTITUDES AND TALENTS AS ASSESSED BY PEERS AND TEACHERS

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How diversified are children's aptitudes and talents? How good are peers and teachers at identifying a large variety of these two types of abilities? How many children can be considered gifted and talented when a large variety of aptitudes and talents are taken into account? These are the three main questions addressed in this presentation. The data come from a four-year research project whose general objective was to validate peer and teacher nomination forms designed to identify a large ensemble of aptitudes (intellectual, creative, socio-affective, physical) and talents (academic, technical, artistic, administrative) among elementary and high school students.

Forty different descriptions of abilities were written, using Gagné's differentiated model of giftedness and talent. They were used to put together ten different experimental nomination forms, each containing between 9 and 12 different items. In the first tryout, each of three pairs of these forms was presented to 30 groups of 4 to 6 grade pupils, as well as to their teachers. The next year, 165 groups of 4 to 8 grade students and their teachers answered one of four revised forms.

Three different series of results will be presented using this large database. First, the reliability of the information obtained with these instruments will be summarized, namely inter-peer agreement, short-term stability of both peer and teacher nominations, and long-term (1 year) stability of peer nominations. Second, data on the construct validity of these forms will also be summarized: Factor structures for both peer and teacher scores, as well as comparisons between these structures; comparison of peer and teacher nominations; gender orientation and gender bias; relationship between the various nominations and academic achievement. Finally, both peer and teacher nomination scores will be used to estimate the prevalence of gifted and talented children, this is the percentage of those who emerge among the best in their group in at least one ability area, as well as those of are judged polyvalent, that is those who emerge among the best in their group in more than one ability area. Levels of polyvalence will be examined, as well as typical profiles and gender effects.

IDENTIFICATION OF GIFTED STUDENTS FROM CULTURE DIVERSE BACKGROUNDS

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A review of previous investigations in the area of identification of gifted students from culture diverse backgrounds indicated that few studies utilized a multiple criteria in the selection process. A current trend in the literature supports the use of a multiple criteria in selecting gifted students, however, there has been limited research which has provided quantitative or empirical findings regarding the effectiveness of the multiple criteria procedure.

The subjects used in the study were 705 students enrolled in a suburban school district located in the Washington, DC metropolitan area. The racial make-up of the group was as follows: African Americans, Asian Americans, Hispanics and Whites. Subjects for this study involved only those students who had participated in a specialized program which identifies and nurtures potentially gifted students from culturally diverse backgrounds. The subjects were divided into gifted and nonidentified students.

This investigation explored the effectiveness of the diagnostic battery based on students' initial performance and students later identification as gifted. In addition, the study focuses on how each instrument included in the diagnostic battery accounted for variance in predicting academic achievement. The findings emerging from this study support the position that a multiple criteria and nontraditional instruments can be effective in the identification of gifted students. This research supports the position that quantitative data can be utilized to contribute to the decision-making process of identification. In addition, the research points to the fact that despite the efforts of a specialized nurturing program, a number of students were not identified as gifted even though their performance on the diagnostic battery might have suggested higher potential. Identification frequently is tied to the academic and achievement of students as the primary indicator of academic giftedness. While academic achievement is important, there are other abilities which should be recognized as traits of giftedness. Efforts such as this diagnostic battery, may provide a means of identifying these unusual gifts.

NORMATIVE AND DEVELOPMENTAL APPROACHES TO GIFTEDNESS IN LANGUAGE AND OTHER DOMAINS

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Potentials for competence in language are probably grossly underestimated by current norms for development, which reflect cultural practices of socialization rather than optimum modes for fostering development. Given the central mediating role of language in many aspects of cognitive development, cognitive potentials themselves are probably also widely unrealized among many populations. It is suggested that the widespread adoption of improved modes of language socialization would multiply the number of individuals in all populations, from the least to the most educationally advantaged, approaching or reaching levels currently classified as gifted. The resulting increase in the number of competent individuals would not of course erase differences originating in genetic potentials, as individual differences would merely be distributed around a higher mean level.

In this paper I will review several types of evidence on how variations in language experience during early development affect competence in language and other aspects of cognitive and social development. This selective review will embrace the following topics: The malleability of various language competencies in young children in response to variations in language experience; the wide variations in language stimulation practices among parents and day care teachers at all socioeconomic levels and how they affect the development of young children's language and cognitive competencies; and the influence of systematic approaches for improving the quality of early language experiences on both short-term and long-term development in language and other competencies. The third topic will cover mainly the research of the author and his colleagues, both past and current research. Our general strategy has combined an informal, socially interactive method of engaging infants in language activities with a cognitive, referential focus on acquiring language. Past research has involved 158 infants in different projects, 66 working with parents in the home and 92 working with teachers in day care. Children come from diverse ethnic, socioeconomic and educational backgrounds. Current research involves follow-up assessments into adolescence.

Following this research review I will then outline plans for further research aimed at exploring a number of questions on language socialization in greater depth, among them: How variations in stimulation at different ages and intensity affect development; focusing on stimulation at all early stages of language development (vocalization, word concepts, syntax, and narration) versus concentrating on the early stages alone (vocalization and especially word concepts); and concentrating on language learning versus embracing a multi-domain learning approach to cognitive development.

TOOLS FOR DETECTION OF GIFTED CHILDREN IN A CLINICAL SETTING

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This study involves ongoing observations of clinical work and research data pertaining to over 80 gifted boys and girls, age 8-12, and their families. These were seen in a child and family clinic on an outpatient basis. Some of these children had not been identified earlier as gifted; others were expelled or dropped out of gifted classes due to deteriorating academic achievements or disruptive behaviour. There was also a small group of children who had never been identified as gifted prior to their contact with us. Thus, upon admission, the majority of children we had identified as gifted evidenced remarkably low IQ scores in comparison to gifted cohorts, in that their IQ scores fell closer to the average than the superior range. This relatively low score rendered the identification of these children as gifted, in most school boards, virtually impossible. Nevertheless, these children shared some salient features with gifted children who were attending gifted classes and considered healthy otherwise. In addition, the gifted children in the Clinic demonstrated some unique features common only to themselves as a group. These data, preliminary and unreplicated as yet, provide some unique venues for identifying gifted children who underachieve or otherwise suffer from emotional of familial problems. Such information can also potentially identify risk factors and steps for prevention.

Our study involved a small sample (N=64) of children divided into four groups, in a 2 x 2 design, controlling for intelligence (average vs gifted) and clinical (clinical vs non-clinical) factors.

Upon admission to the clinic, all children received a battery of psychological tests. The children and their families were also subjected to assessment interviews. Parents completed questionnaires relating to the children's behaviour, family functions and to themselves as parents and spouses. Some of the children and/or their families were then referred for treatment including: individual, family or group therapy.

Our findings clustered these children into the following categories:

1) Inconsistent intellectual profiles. These were mostly boys who showed fluctuations in their IQ scores ranging from 15-30 points. Yet discriminant item analysis of their WISC-R subscale scores revealed that these children could be identified accurately as gifted with 75% accuracy ($p < .001$) based on the unique profile for this group. This profile revealed that three or more WISC-R subscale scores were in the superior range. Of these, the most powerful in discriminating the gifted were: Similarities, Block Design, Comprehension and Object Assembly. In contrast, the lowest subscale scores ranged from 0 to 10 points. There was

also a trend for VIQ > PIQ. Girls generally showed a relatively more consistent profile and higher IQ scores unless they were found to be learning disabled.

2) In contrast to the WISC-R results, the Goodenough Harris DAP scores showed no discriminating signs between the two gifted groups. Similarly, for creativity as measured on the Torrance Test of Creative Thinking (TTCT) and the House-Tree-Person (HTP) utilizing Amabile's rating. Both gifted groups, were significantly more superior on intelligence and creativity as compared to cohorts of average intelligence. Creativity also signified both gifted groups on the Rorschach (Exner scoring).

3) The above two attributes of creativity and intelligence generally considered as unique assets of the gifted, did not contribute in any manner to the identification of emotional, social or familial problems for the gifted. The gifted children emerged as having just as many problems Internalizing as they do Externalizing on the Child Behaviour Checklist. Their problems were no less severe than those experienced by cohorts of average intelligence. Similarly, although the gifted verbal output on the TAT was significantly higher than that of children with average intelligence, they did not demonstrate higher aggressive expressions (except on one card). They did, however, evidence functioning on a higher level of abstraction (also on Rorschach), which also correlated with preoccupations with more abstract themes and global/humanitarian issues.

4) Although on a Family Assessment Measure parents of gifted children did not significantly differ from parents of nongifted in rating family functioning, when it came to the discrepancies in ratings between mothers and fathers and self-rating by fathers, results were highly significant in distinguishing the gifted-clinical group from the remaining three comparison groups. Briefly, these results identify a pattern unique to the gifted clinical group, where mothers of boys identify less problems then do fathers, evidencing serious marital disagreements. At the same time, fathers of the gifted group rate themselves as having more problems in their families than any of the fathers in the remaining three groups.

5) In group therapy the gifted have been found to benefit from a unique treatment program at a rate faster than that of children with average intelligence. This program is geared to capitalize on their intelligence and verbal skills, while focusing on the development of social skills.

6) Family therapy, utilizing an intensive-brief therapy model, has also proved most effective for these families so far. The details of this method are outlined in a book by the author.

In summary, the above criteria of assessment as well as treatment will be reviewed as tools for identifying gifted children who "fall between the cracks" or are otherwise forgotten.

LEARNED EFFECTIVENESS AS A MODEL FOR THE UNDERACHIEVING GIFTED ATHLETE

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Young gifted athletes represent future heroes in our society. National record holders, Olympic champions, Super Bowl MVP's and the next Michael Jordan may be lost along the way because of a dysfunctional motivational pattern known as the underachiever. The underachiever can be defined as a "natural athlete" who has achieved success without hard work, pride or self discipline (Vernachia, 1992). Because these athletes lack self-discipline, pride and a strong work ethic they fail to reach their true potential. Many times they get lost in sport and their potential is unfulfilled. This presentation will discuss this phenomenon and present a solution to the problem in terms of a learned effectiveness model (Rotella, 1987). This educational model encourages effectiveness through goal setting, mental toughness, balanced time orientation, thought control and concentration training.

Literature will be presented related to the gifted underachieving in athletics and the learned effectiveness model.

It will be the purpose of this presentation to provide a theoretical base for teachers and coaches to use with the gifted underachievers.

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GIFTED INTELLIGENCE: A LONGITUDINAL STUDY OF DEVELOPMENT FROM INFANCY THROUGH THE EARLY SCHOOL YEARS

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Psychologists have highlighted the need to investigate the early course of development in the intellectually gifted to further our knowledge about it, and to aid in early identification and educational programming (Horowitz & O'Brien, 1985; Roedell, 1989). There is a void of longitudinal, empirical data on the early developmental aspects of gifted children prior to identification. The present study provides a unique opportunity for investigating the developmental aspects of gifted intelligence for many reasons, two of which are as follows. First, because we have studies children from infancy through the school entry years, we were able to conduct a retrospective analysis of systematically collected longitudinal data. Second, their project encompasses a comprehensive array of conceptually derived measures tapping various developmental domains. The methodological framework was designed to obtain continuous and contemporaneous information throughout the time frame of the study. Moreover, data collection comprised both cross-context (lab and home) and multiple-person assessments (child, parents, and teachers).

This investigation is based on an ongoing longitudinal study of 130 middle-class children and their families. Assessments occurred every six months from age one through the preschool years and yearly from age five onward. At age eight, children were identified as intellectually gifted if they obtained an IQ score of 130 or greater on the WISC-R, permitting designation of the gifted and nongifted groups. Twenty children were gifted. Lab assessments consisted of cognitive, academic, motivational, and social assessments. Home environments were assessed directly during the infancy, preschool, and school age years. Parents completed ongoing social history intakes, family environment surveys, and temperament and behavioral inventories. Teachers also completed standardized student functioning inventories. All measures used were standardized.

Multivariate and univariate statistical analyses will be presented. Overall, our present results reveal early cognitive, achievement, environmental and motivational differences between the gifted and nongifted groups, many during the infancy years. The gifted child's active role in eliciting a stimulating environment, and their early manifestation of goal directedness and attention span on cognitive tasks, will be addressed.

OUTCOMES OF THE NEBRASKA PROJECT
REPORT OF WORK IN PROGRESS

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The purpose of this report is to describe work in progress on three major products--outcomes of the Nebraska Project that are being developed and field-tested during the school year 1991-1992. One: a developmentally appropriate, constructivist approach is being implemented in a stratified sample (N=24; 8 kindergarten, 8 first grade and 8 second grade) of Nebraska primary-grades classrooms. Two: a behavior-based observation protocol, grounded in developmental and gifted education research and expert opinion, has been developed and is being field tested by 48 teachers (24 constructivist and 24 non-constructivist) in 36 school districts in Nebraska. Three: the Concerns-Based Adoption Model (CBAM) is being utilized as an evaluation component to: 1) identify and address concerns of teachers during the implementation process for both the constructivist approach and the observation protocol; 2) define what the constructivist approach "is" using Innovation Configuration; and 3) interview Projec teachers using a structured process as a way of confirming the extent to which implementation--change (for both constructivism and observation) has occurred. The purpose of the Nebraska Project is to select/devise and implement a constructivist approach in a stratified sample (71% rural, 29% urban) of primary grades classrooms in Nebraska as a way of assessing the efficacy of this approach in the early identification of able and creative children. To test the underlying assumption, that children in a developmentally appropriate constructivist classroom will have more opportunity (than in a non-constructivist environment) to exhibit behaviors by which they identify themselves, both a constructivist approach and an observation protocol were developed and are currently being field-tested in Nebraska schools. Twenty-four 'experimental-group' teachers were selected from a pool of teachers nominated by school principal(s). Nominations were based on characteristics of a developmental philosophy as exhibited by the teacher. The experimental group was prepared in a series of three teacher training workshops to implement the constructivist approach during the 1991-92 school year. A 'control group' of twenty-four teachers, also selected from the nominated pool, were designated as the 'non-constructivist' teacher sample. A behavior-based observation protocol was conceptualized, developed, and all teachers in the study have been trained in its use.

SEEKING THE ELUSIVE GIFTED CHILD

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Gifted children occur in the same proportions among humans of all racial origins. However, there is a great discrepancy among those identified. Using the WISC and Binet R, and such pretest screening devices as have been designed over the years, with a State of Florida definition of the "gifted" child has having a score on such measurements of two standard deviations above the mean, Hillsborough County has more Caucasians, far more Asians, fewer Hispanics and far fewer Blacks than the premise in the first sentence indicates. Those non-Caucasian students who are identified are most likely to come from middle class families with middle class educations and aspirations. We find being identified as gifted students who are described as quiet and soft spoken, polite, well behaved, capable of responding to direction, respectful, neat, clean, prompt, healthy looking and with an excellent command of standard English.

These traits do not require brains, only a close set of adults who have the traits themselves to serve as role models. A little money for nice clothes helps, as do parents who have the time and interest to read and converse with the child.

The child who is angry, who is loud, impulsive, rude, even violent at ties; who is dirty, or at least messy, whose classwork is unprepared, homework is in tatters, who has not grown up with multiple possessions to play with and a room to keep neat (requiring sorting and organizing of possessions) who speaks a dialect of English--perhaps with a syntax unrecognized by most mainstream Americans, and certainly with a pronunciation rejected by the mainstream--will not be recommended for gifted programs. Furthermore the student from such a background who shows promise early on, is thought to lose ground, become more stupid with age. This is derived from the fact that IQ points tend to diminish as such children become more acculturated in the milieu in which they find themselves.

It is the premise of this paper that children are always learning... something. The older gifted child is still gifted, but we are still seeking the means of assessing his intelligence. Existing measures designed to help with this may not reflect local influences.

Checklists will be presented which have been developed with oversight by lay and professional people who are from those underrepresented backgrounds, and are also familiar with the culture of the very poor.

Committee members: Carlos Diaz and Raymond Johnson, Teachers of Gifted, Leartis Mayes, Supervisor of Compensatory Education Programs, Edilio Robles, School Psychologist, Rev. Herman Moten, Director of Counseling Center.

EXCEPTIONAL ABILITY IN PRESCHOOLERS REFLECTED THROUGH EMERGING COGNITIVE STYLE

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Identification of intellectually gifted preschool-age children is a complex, sensitive task. Research indicates the early years are significant, if not critical, period for the development of both cognitive and social skills (e.g., Sroufe, Egeland, & Kreutzer, 1990; White, 1983). These skills appear to develop extraordinarily well even in some children disadvantaged through economic or minority status, despite the frequent illusion of incompetence (Haensly, 1987; Phillips, 1984). When we seek to identify giftedness in children from almost any culturally diverse population attempting to function in our predominantly Anglo, Western culture-based system, we realize we must often use nontraditional methods for finding their intellectual competence (Haensly, 1991a, 1991b; Hans & Musick, 1990). That is, we must see beyond the illusion of incompetence, "reading" their behaviors in light of the demands of their environment (Sternberg, 1977). When we do this we frequently find their behavior extremely functional, an intelligent adaptation to environmental demands quite different from those of children in even moderately affluent settings (Haensly, Wehrly, & Ash, 1991).

Using emerging cognitive style for identification of giftedness and as a way of understanding how the young child may be expressing his or her intelligence was prompted for us by the above mentioned works, as well as by that of Neimark (1985), Brodzinsky (1985) and other researchers of moderators of competence (Neimark, DeLisi & Newman, 1985). Cognitive style can be observed as patterns in the child's attention to certain stimuli, solutions paths taken, verbal or figural explanations for solutions, and types of responses and errors. These patterns reflect the child's thinking about the problem as they perceive it, with the egocentricity-limited child often constructing problem boundaries according to his or her limited experiences. Intelligent problem-solving may then have been for a problem defined differently than the test administrator or observer had intended.

During the screening of children for MINDS ALIVE, a summer program designed for intellectually gifted 3- and 4-year-olds, careful attention is paid to these patterns during the Ravens Colored Progressive Matrices (RCPM), an academic skills readiness test, and the dialogue of the assessment session, as well as in a detailed analysis of the parent questionnaire completed for each child. For example, the response styles to the RCPM items diagnose specific progress through Piagetian preoperational stage; or, a longstanding record of attention to stimuli such as alphabet symbols, geometric shapes, or numbers suggest areas explaining current advanced ability.

Recently we began to see the possibility of using this type of analysis not only to plan curriculum but also to identify gifted cognitive styles. Remarkable consistencies between the screening analysis at age 3 or 4 and feedback from K and first grade teachers who had not received the original analyses have been observed for several children. Cognitive styles have shown

stability, even when dysfunctional in the more rigid public school setting. We are now attempting to follow our other participants from the 1987-91 program years.

We propose to present tentative findings on the emergence of cognitive style in young children as a stable characteristic and to explore developmental theory implications, with the objective of understanding more specifically the relationship between cognitive style and ability level. Hypotheses and explanations will be grounded in cognitive and social developmental theory.

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NARRATIVE ABILITIES OF GIFTED CHILDREN WITH LEARNING DISABILITIES

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The narrative language abilities of gifted children with learning disabilities is an essentially unexplored area of child language-research. Despite evidence that Learning Disabled (LD) children experience significant difficulty understanding and producing narratives (Klecan-Aker & Kelty, 1990; Norris, 1985; Norris & Bruning, 1988; Page & Stewart, 1985; Roth & Spekman, 1986, 1989; Silliman, 1989; Scott, 1988), few child-language investigators have extended their research to include gifted children with learning disabilities (i.e., Gifted/LD, LD/Gifted). In a search of the Gifted Education and Learning Disabilities literature, only two studies (Ganschow, 1986; Weeks, 1974) were found that examined narratives produced by gifted children with learning disabilities. One researcher (Weeks, 1974), using a gist recall paradigm failed to detect any narrative language differences between her gifted subject with learning disabilities and the normal, gifted controls included in her study when she examined their samples for grammatical maturity and accuracy of information recalled. The other researcher (Ganschow, 1986), however, examined the written stories produced by her three subjects and concluded that their narratives were grammatically immature, contained numerous invented spellings, and lacked critical cohesive elements. So, what is known about the narrative abilities of Gifted/LD or LD/Gifted children is based on a limited number of research studies, yielding seemingly contradictory results. It will be argued that these discrepant findings are due to inherent differences in the testing methodologies used.

A synthesis of what is currently known about the narrative abilities of gifted children with learning disabilities will be provided. Also, spoken and written story narratives elicited from two school-age, gifted boys with learning disabilities will be examined and then compared to the spoken and written story narratives elicited from two gifted boys matched for age.

A RE-EXAMINATION OF EIDETIC IMAGERY

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A review will be made of several aspects of research and scientific observation concerning the talent of eidetic imagery, including an analysis of the circumstances in which this phenomenon has been observed, a description of the characteristics of persons who exhibit this ability, and a review of the methodology employed in the research. A search will also be made in the popular literature for reports about "photographic memory" and about demonstrations of that skill to see if any additional objective information can be gleaned from those sources.

The literature will be searched for indications as to how eidetic imagery could be used to one's advantage in serious ways. Also, individual cases will be studied seeking information about the initial occurrence of the talent, its use, and its tendency to disappear. Special attention will be given to any comments by researchers as to whether there is any way to consciously influence the acquisition or retention of the talent. Can it be preserved in those who possess it? Can it be developed in anyone who shows a modicum of prolonged visual memory?

A critical judgment will be offered as to whether there is enough substance and promise for the talent called eidetic imagery to warrant the use of new high technology in its investigation. Answers will be sought for such questions as:

1. Can new diagnostic and testing technology define more accurately the neurological correlates of eidetic imaging?

2. Can the eidetiker take advantage of more sophisticated ways of recording his subjective experiences while "imaging?"

3. Can we improve on the identification of other characteristics of the gift?

Suggested lines of research might be the study of brain waves in the eidetic state, biochemical states, such as hormonal levels of the subject, and triggering events. Also of interest would be information about the home environment experienced by the eidetiker and the child-rearing styles of the parents, particularly focusing on levels of acceptance of this unusual talent.

ROYCE'S PSYCHO-EPISTEMOLOGICAL PROFILE: SUGGESTIONS FOR ITS USE IN RESEARCH WITH GIFTED CHILDREN

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Review of the Literature

According to Royce and Smith (1964), there are different ways in which people approach reality. Each person has a characteristic pattern or hierarchy of responses on the three approaches (empirical, rational, and metaphorical), and this hierarchy of approaches to knowledge is reinforced by the individual's environment (Royce, 1964). These approaches to knowledge are styles in which both cognition and affect are integrated and provide a framework that mobilizes one's abilities for a task (Royce & Powell, 1983). Typically, an individual's response hierarchy is consistent within a certain career choice, that is, one becomes "encapsulated" within a particular approach to knowledge which is appropriate for the chosen career. In essence, people tend to become specialists, both in discipline and in the corresponding approach to knowledge (Royce, 1964).

Royce, Mos, and Kearsley (1975) have developed a questionnaire (the Psycho-Epistemological Profile [PEP]) which attempts to measure an individual's degree of commitment to each of the three ways of knowing. The PEP has not been used as widely in research as one might expect, given the richness of the theoretical view it represents and the practical implications, particularly educational, of the constructs it purports to measure. Furthermore, it appears that little use has been made of the instrument with subjects below the college level (Hinton & Clark, 1991), particularly with gifted students who could be characterized as being intellectually engaged with the world.

Directions for Future Research

First, while Royce would predict that school-age children's predominant approach would be empirical, he also predicted that children would also indicate nearly equal interest in acquiring knowledge through empirical and metaphorical approaches. However, this prediction was for children in general; perhaps gifted students would exhibit different preferences and profiles from typical ability students and might also differ according to the area of giftedness. Therefore, further research is in order, possibly directed at examining the preferred approaches of the Psycho-Epistemological Profile with students who are characterized as gifted in various areas and comparing their approaches to those of typical ability students.

Second, while it has been suggested that students' manner of acquiring knowledge would be predominantly rational in nature, there are some problems with the use of the PEP, as currently scored. Simply identifying the highest

scale score for an individual or mean score does not indicate the strength of commitment to that approach relative to other approaches. Further consideration should be directed to examination of individual's strength of commitment to the various ways of knowing.

The Psycho-Epistemological Profile's rich theoretical perspective responds to earlier criticisms of the lack of theoretically-based research on scientifically able students (Michael, 1983). Perhaps knowledge of their preferred epistemological profiles will enable gifted students to reflect on their own approaches to knowledge (Bireley, 1991) and the approaches of others with whom they interact (Clark, 1987; Bireley, 1991).

PROPOSED RESEARCH AGENDA TO DEFINE THE DEVELOPMENT OF THE CONSTRUCT(S) OF PROBLEM FINDING ABILITY AMONG GIFTED INDIVIDUALS

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Proposed Session

The ability to find and define problems has been recognized for some time as an essential part of the development of superior performance among individuals who have made significant contributions to the world. The early, pioneering work of Getzels (1982) and Getzels and Csikszentmihalyi (1967, 1975) established the importance of the concept of the development of creative products. Sternberg and Davidson have identified the ability to formulate problems as one aspect of giftedness. In addition, many programs for the gifted have included training in identifying and defining problems as a major component of the creative process. Nevertheless, while the importance of problem finding has been defined, there has, to date, been very little research which has looked specifically at the components of the problem finding process.

This session will present the results of two studies which have looked at problem finding in the gifted in the context of the ability to formulate scientific hypotheses. These studies were conducted on 9th and 5th grade gifted students and show some interesting developmental trends in the students' ability to formulate scientific hypotheses (Hoover & Feldhusen, 1990; Hoover, 1991). Furthermore, these studies will be placed into the context of an agenda to elucidate further a proposed model for defining the constructs and processes involved in problem finding (Hoover & Feldhusen, in press; Hoover, 1990).

Specifically, this session will present a model of problem finding behavior which includes four major components: Memory Organization/Structure and Facilitative Retrieval(Knowledge Base); Cognitive Strategies (Specific Strategies & General Heuristics); Executive Processes (Metacognitive Strategies); and Non-Intellective Processes (Motivation, Style). While these components do not necessarily represent significantly new approaches, what the model proposes for the problem finding process is the manner in which the components interact as an individual strives to make sense out of the world. What essentially is proposed is problem finding behavior as a process model which is directed by the interactions among the components of the behavior resulting in a set of possibilities (hypotheses) which act as problems to be explored (solved) in an attempt to extend one's understanding of the world.

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INFANT TESTING AS A PREDICTOR OF POTENTIAL IQ IN THE AT-RISK GIFTED CHILD

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Test bias prevents many children who are at risk from any number of factors from receiving the extra stimulation that could help them achieve their full potential. In many cases, if their test scores aren't high enough, they will not make it into the gifted programs. Early intervention is impossible without a reliable and valid measure of intelligence. Test bias could be avoided through the use of infant tests. Unfortunately, most infant tests commonly in use today are sensorimotor tests that do not correlate well with later intelligence scores until about the same time that environmental factors start showing a strong effect.

Infant recognition memory tests, and in particular the Fagan Test of Infant Intelligence (FTII), show a strong correlation with the Stanford-Binet and other standardized intelligence tests given to school-age children. It shows a strong specificity for identifying children in a normal intelligence range, something that the sensorimotor tests lack entirely in tests given to infants. The FTII shows both validity and reliability across ethnic and racial backgrounds. Linguistic problems do not affect the scores, since the infants tested are pre-language, and the test items are non-language.

Dr. Fagan, the originator of the FTII, is currently working on the normative data necessary to apply a version of this test to potentially gifted infants.

STRATEGIES FOR MODELING THE DEVELOPMENT OF GIFTEDNESS IN CHILDREN

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The development of various gifts in remarkable individuals has been described in a rich case study literature (e.g., Hollingsworth, 1942; Feldman, 1986; Goldsmith, 1987). However, we lack empirically validated, comprehensive predictive models of the development of giftedness in childhood. For example, no model of the development of gifted performance in childhood has been specified as adequately as Simonton's (1991) model of the development of eminence in adulthood. We need to develop and test models that are grounded in coordinated consideration of what we have learned about the nature of giftedness and achievement, the nature of development, the prediction of extreme deviation,and the methodological challenges inherent in considering these complex questions.

My own work on the development of children who have been identified by age six years for remarkable precocity in reading is moving toward the specification of longitudinal models predicting the children's subsequent achievements. The following assumptions are guiding my thinking

-Giftedness is not a stable trait inherent in the individual. Rather, gifted performances represent fortunate conjunctions of person, task, and contextual factors that may or may not occur repeatedly across an individual's childhood and adulthood.

-Giftedness in childhood should not be reduced to measures of aptitude or potential for future productivity (Humphreys, 1985). Childhood giftedness, like adult giftedness (Siegler & Kotovsky, 1986) is more usefully conceptualized as creative-productive giftedness. Aptitude (for potential) and giftedness are related to one another, but they are different constructs.

-Predictive models of tne development of creative-productive giftedness in childhood based on conventional statistical procedures such as linear structural equation modeling are likely to fail. Giftedness is a rare event, the predictors of giftedness are likely to interact in complex ways, and linear variation in outcomes may not be of interest. Models of the development of giftedness should be grounded in intensive qualitative and quantitative analyses of individual cases and microgenetic processes.

-Alternative models of the development of giftedness that merit comparative evaluation include alternatives emphasizing either proximal or distal variables, the epigenetic unfolding of abilities, changing transactions within a personal-social system, specific and general cognitive aptitudes, or motivational factors such as attributions and choices among competing interests.

-Continuity in gifted performances across childhood is likely to be heterotypic (Kagen, 1971) and to reflect both age-related differences in important developmental tasks and changes in the nature of what constitutes gifted performance in a domain as expertise develops. For example, precocious readers may demonstrate later creative-productive giftedness in mathematics or computer programming rather than continued excellence in literary activities.

THE NATURE OF EXPERTISE

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Most of the research on creativity that enlists the expertise of the artist takes the form of personal accounts and retrospective reports (Ghiselin, 1952; Koestler, 1964; Roe, 1975). However, two empirical studies (Getzels & Csikszentmihalyi, 1976; Patrick, 1937) sought to identify the processes behind the creative thought in artists. Both studies involved observation of behaviors during a drawing task. Patrick's (1937) study of artists and non-artists labeled the observed thought processes as depicting a stage of unorganized followed by a stage of organized thought. Similarly, the study of creative and less creative college art students (Getzels & Csikszentmihalyi 1964; 1976) depicted a problem-defining then problem-solving stage to thought processes reflected through observed behavior.

However, Patrick (1937) did not find differences between the artists and non-artists in the amount of time spent before engaging in the actual drawing or for the total amount of time spent on the entire task, yet Getzels and Cslikszentmihalyi (1974; 1976) found differences between their creative and less creative art students. Secondly, Patrick found that the artists did not change the essential structure of their work but only revised the surface structure. The art students identified as more creative in the Getzels and Csikszentmihalyi study are said to be most willing to change their entire product (Getzels and Csikszentmihalyi, 1976; Perkins, 1981).

Enlisting 60 adult participants, further research was conducted to address these differences. The qualitative data collected during an empirical investigation of differences in professional artists, semi-professional artists, and non-artists leads to some issues that continue to deserve further investigation.

Based on a discriminant analysis, clinical observations, and the verbal protocols, the results of the study when analyzed with the expert versus novice literature (Chi, Feltovich & Glaser, 1981; DeGroot, 1965; Schoenfeld & Hermann, 1982), offers plausible explanations for the previous conflicting results.

The professional artists exhibited a behavior that I have labeled a "personal aesthetic bias." The distinctive aesthetic that guides their creative thought processes when producing ideas in art was reflected in the behaviors of a game task that does not purport to have any association with the complexity involved in the creative thought processes involved in producing art.

Supported by the verbal protocols, it appears that the problem-finding process that is often depicted as one of total freedom is actually quite constrained by a well-developed aesthetic perception. This personal aesthetic bias behaves like the engineering of a fine bridge, offering tensile strength to the pursuit of an idea.

The phenomena appears to transcend personality, gender differences, and the nature of the art work produced (painter or sculptor). Most intriguingly, all of the professionals exhibited a personal aesthetic style, yet analysis of their working styles (approach to studio problems) varied tremendously.

QUANTITATIVE ELECTROPHYSIOLOGY TO THE STUDY OF BEHAVIOR IN GIFTED AND TALENTED CHILDREN

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Developments in the cognitive neurosciences and brain neurophysiology during the last two decades have provided a converging perspective on the dimensions of mental activity typically explored within psychologically based, behavioral paradigms. Recent developments in the quantification of brain electrical activity have provided support for the use of this technology for examining specific dimensions of cognition. These techniques and technologies allow the researcher and theoretician to study process correlates and differences in various populations without resorting to the circularity implicit in the inferences derived from cognitive measures initially correlated with the population separation criteria.

A multidiscipline team has begun to carry out research directed at examining the profiles of gifted children, with and without learning problems. The measures employed in the current and proposed studies represent neurophysiological, neuropsychological, psychometric and personality characteristics. The tests all have normative data sets so that the two groups of gifted children can be compared to a sample of average, healthy age peers, as well as to each other. The several protocols tap various basic cognitive processes using test procedures which are direct or indirect assessments of those processes.

The team has, to this point, carried out pilot research which lends strong support to the strategy. The empirical position being pressed is that the total information yielded by these procedures is more than the sum of its parts, (as is cognition), and that the present data provide enough empirical support for the idea that it is necessary that the present data provide enough empirical support for the gifted, include functional neuroscientific measures as the direct evidence for the differential involvement of the brain in different levels of intellectual activity.

Our presentation will start by describing briefly the history of the studies showing a correlation between brain function and behavior in cognition and for different levels of intellectual performance, and then will describe the "state of the art" in this field. We will provide brain electrical activity profile data in the form of topographic maps of neurophysiological activity, showing the differences between gifted and normal functioning children, and similar data on gifted learning disabled, and gifted non-learning disabled children. The correlation of brain electrical activity and regionally specific neuropsychological activity will also be provided, lending a confirmation of the (at this point heuristic) bridge between brain function and behavior for these children.

We will finish our presentation by describing the near future needs in research to integrate this technology into the general diagnostic/predictive and proscriptive work and gifted children, and describe our current plans for an international study in this area.

NEW DIRECTIONS IN THE IDENTIFICATION OF "HIDDEN GIFTEDNESS"

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Recent reports on the state of education in America have consistently concluded that we are in a period of crisis. The widely referenced document A Nation at Risk (1983) makes the startling claim that well over half of the population of gifted students do not match their tested ability with comparable achievement in school. Response to this and other related reports has spurned a variety of initiatives in both general and special education, aimed toward a better understanding of how our current systems of education operate and how best we might direct services and resources to better meet the learning needs of all students. Terms such as Regular Education Initiative, Restructuring the Schools, School Reform, Inclusive Education, Effective Schools, and Collaborative Consultation encompass the predominant themes of current efforts. Collectively these broad-based movements are forcing educators to re-examine all dimensions of educational practice, from legislation to school organization, to curriculum, to teacher roles, to resource deployment, and most important, to individual student learning needs. The current challenge that faces all participants in education systems is "How can we satisfy the seemingly contradictory notions of excellence and equity in schools of the future?"

Educators and researchers involved in the field of gifted education have similarly had to analyze and articulate their concerns and visions for future schools. One important dimension of this process is a recent focus on those gifted students, who for a variety of factors, are not easily identified when the typical standardized testing procedures are used, and consequently are referred to as "hidden gifted." The term applies to numerous subgroups who have variously been referred to in the literature as gifted/LD, gifted handicapped, at-risk gifted, culturally different gifted, rural gifted, gifted underachievers, and gifted females. Each subgroup presents a unique challenge to educators, although these groups share the unfortunate commonality of having significantly greater risk of failure to achieve or develop their gifts or talents to their level of potential. The issue is not a trivial one and has, beyond the individual level, implications for the greater loss to society in general.

In this presentation, an analysis and synthesis of the current state of knowledge emerging from the extant research and literature will be provided. A critical review of traditional efforts will be outlined along with summary recommendations for future research in this area in particular. Finally, a current research initiative will be outlined, which represents an initial effort to ameliorate many of the limitations of traditional research in areas associated with hidden giftedness and attempts to align with current trends in the future direction of schools and education reform in general. Data will be presented which first of all documents the extent of the general problem of

student potential that is not actualized in academic achievement in school, and specifically addresses our research initiatives concerning patterns and developmental indicators of untapped potential in subpopulations of gifted females and culturally different gifted students in grades 4, 7, and 10 in fifteen schools in a large urban Canadian school division. Issues and recommendations for future research efforts will be discussed.

USING THE LOWER LEVEL OF THE SSAT TO IDENTIFY MATHEMATICALLY TALENTED ELEMENTARY SCHOOL STUDENTS

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The Talent Search concept, in which mathematically and verbally talented junior high school students are identified via the Scholastic Aptitude Test, was pioneered by Julian Stanley in the 1970's. Today, over 100,000 students a year participate in Talent Searches offered by centers throughout the country, and many of those students are invited to attend challenging academic programs. In an attempt to extend the Talent Search concept to talented students younger than age 12, researchers have begun investigating the potential of various out-of-level tests are identifying talented elementary schools students.

The Lower Level of the Secondary School Admission Test (SSAT) was proposed as an appropriate out-of-level instrument. Assouline and Lupkowski (1991) pilot-tested its use by administering the quantitative section to a group of 50 children. Scores for the children in their sample ranged from the 1st to the 96th percentiles when compared to students two years older. This indicated that the SSAT-Quantitative "was effective at differentiating the range of ability for students already identified as being academically able" (p. 212). They tested only 50 children, however, and the next step is to determine whether or not similar results are found with a larger sample. Those results would also suggest appropriate score guidelines for further diagnostic testing and subsequent programming.

The presentation will describe work in progress. Approximately 600 children in grades 3-5 will be tested in October - December, 1991. The children were nominated by school personnel for participation in the study, and all of them have scored at the 90th percentile or above on one or more mathematics subtests of a standardized test such as the Iowa Tests of Basic Skills. Children will take all three sections of the SSAT, including the Quantitative, Verbal, and Reading Comprehension sections, and results for all three of these sections will be reported. Children and parents completed questionnaires on children's achievements, interests, and family backgrounds; preliminary questionnaire findings will be discussed. Recommendations for modifying talented students' educational programs based on the study findings will also be included.

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BEYOND IDENTIFICATION: TOWARD ASSESSING DEVELOPMENTAL ADVANCEMENT BY DOMAIN

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On the basis of current findings in cognitive development, it appears that giftedness is not so much a fixed trait (e.g., high I.Q. or creativity), but a result of developmental advancement by domain (Gardner, 1983; Horowitz & O'Brien, 1986; Keating, 1990, 1991; Matthews, 1988, 1990).

If this point of view is applied to gifted education, our practice of identifying "the gifted child" is radically reconceptualized. Instead of looking for some quantity of an inner, unseen essence of a person, like high intelligence, we would instead be assessing, by subject area, a student's zone of proximal development (Vygotsky, 1930/1978). If giftedness is advanced domain-specific development, then identification procedures must attempt to determine that learning zone which is both challenging enough to be interesting, and familiar enough to be mastered. Simply put, our assessment goal in the field of gifted education would become one of attempting to match instruction to the student's developmental level (Keating, 1991).

In order to accomplish this goal, identification of special educational needs would become, not the determination of intelligence and aptitude scores, but instead an ongoing assessment process, by subject area, a process integrated with program and curriculum (Hoge, 1988, 1989; Gardner, 1988).

Such ongoing curriculum-based assessment can currently be most readily done in the traditional academic areas of language and mathematics, where we can adapt broad-based, psychometrically sound instruments, such as the Stanford Test of Academic Skills: Third Edition (1989), which tap into reasoning skills and minimize penalties due to lack of familiarity with specific content details. By using such tests at above-grade levels, we can minimize ceiling effects which otherwise obscure high-level individual differences (Keating, 1991), and obtain an idea of where to start in matching a student's curriculum to advanced developmental level.

A discussion of a project that used this assessment approach will be included in the proposed paper. To briefly summarize the findings, when using participants in self-contained gifted classes (students who had been identified on the basis of global giftedness), it was shown that there was almost as much diversity by subject area as within a regular classroom. With so little in the way of increased homogeneity gained by cross-domain approaches, the data were interpreted (when seen in conjunction with other findings) as supportive domain-specific assessment and programming (Keating, 1991; Matthews, 1990).

Assessment in the social domain (that is, combining Gardner's [1983] Interpersonal and Intrapersonal Intelligences) is an area currently receiving some research attention, and will also be addressed in the proposed paper, both in terms of recent findings and work in progress. Matthews' findings (1990) support the social domain as a coherent and separate domain of ability when contextually-measured, that is when actual social competence--rather than the ability to answer questions about the--is assessed. This is consistent with the observation (Ford & Tisak, 1983; Keating & Clark, 1980; Pellegrini, 1985; Sternberg & Smith, 1985) that social ability, interactive and dynamic in nature, is not easily reducible to the structured written formats used to measure other abilities.

In summary, this paper will discuss progress that is being made in reconceptualizing the gifted identification process. It is based on current findings suggesting that the goal of gifted identification should become one of matching curriculum to students' developmental levels, on a domain-by-domain basis.

IDENTIFYING ABILITY STRUCTURES USING CONFIRMATORY FACTOR ANALYSIS: SOME INSIGHTS FROM NEWBORN ASSESSMENT DATA

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The identification of exceptionality ability begins with the way in which it is defined: Generally or specifically. Spearman (1904, 1927), noting an overall pattern of correlations among all tests he examined, demonstrated that the abilities of preparatory school students measured by performance within course subjects were best defined by two factors, 'g', a general factor, and 's', a specific factor, unique to each type of task. Later, Thurstone (1932, 1938) proposed that there was no general factor accounting for all abilities. Rather, intellectual abilities were defined by independent, primary factors. Using exploratory factor analysis methods on psychological test data from college students, Thurstone found nine factors represented by the data. These two theories have provided the impetus for a large amount of research within developmental psychology.

Support for a general factor for abilities within infancy has been posited by such researchers as Plomin (1986), suggesting that infant abilities are general and undifferentiated, and that differentiation occurs sometime after infancy. Others, such as McCall et al. (1972) have proposed that general intelligence or 'g' does not exist at any age. The development of an assessment tool for use within the first month of life (Neonatal Behavioral Assessment Scale (NBAS), Brazelton, 1973, 1984) has provided support for Thurstone's multiple factor theory, though not explicitly. The 27 items of the NBAS are typically collapsed into six clusters defining the newborn infant's behavioral repertoire. Although the NBAS has been examined using exploratory factor analysis methods, few studies have used conformatory factor analysis methods, designed to test explicitly defined models. An hypothesized model can be compared with competing models in order to determine the best-fitting model to the data.

In the current research, we tested the previously discussed competing theories for newborn ability structures with NBAS data using confirmatory factor analysis of covariance matrices. Models comparing multiple independent factors, multiple correlated factors, and models estimating a general factor with multiple primary factors were tested. The results indicated that although a general factor model with primary ability factors fit the data best overall, abilities were found to be relatively distinct, even within the first days of life. The results of this research have implications for identifying giftedness within multiple domains for older children, and future research should be encouraged to continue to consider these methods.

A DEVELOPMENTAL APPROACH TO AESTHETIC EXPERIENCE

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The present study addresses issues germane to the nature and training of critical judgments in aesthetic understanding. This study investigates two perspectives on a theory of developmental aesthetics (Housen, 1983; Parsons, 1987). It was hypothesized that variations in responses to works of art reflect different aesthetic orientations and developmental differences between viewers. Seventy-one subjects were recruited and placed into one of five groups based on their age and amount of interest and previous exposure to art. Subjects examined prints of works of art and completed written questionnaires devised to identify the criteria employed in understanding and judging a work of art. Both chronological age, and level of expertise were considered in the analyses of responses.

The results of this study illustrate the theoretical distinction between universal and nonuniversal developmental domains (Feldman, 1980). Overall, developmental differences were verified in the domain of aesthetic experience. Evidence was found to suggest that the amount of interest and exposure one has to works of art had the strongest overall impact on level of aesthetic development. While this study set out to determine which stage model was best supported by the empirical evidence, the findings tend to both confirm and challenge aspects of the developmental stage models articulated by the two theorists. Support of both schemes suggests that each model discriminatesdistinct aspects of an aesthetic response. Since the two models are not congruous, however, these findings raised some interesting questions that might serve to catalyze future lines of research on understanding the development of expertise in aesthetic judgment abilities. By integrating and refining the existing conceptualizations it is possible to assert plausible developmental account of aesthetic understanding. This will help us clarify the level-specific characteristics unique to this domain as it gives us a more comprehensive and accurate picture of the growth of aesthetic judgment abilities.

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EXTREME GIFTEDNESS VIEWED CONTEXTUALLY AND PHENOMENOLOGICALLY: THE CASE STUDY OF "JENNIE"

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"Jennie" is an exceptionally gifted children whose IQ at age 4 years 6 months measured 176 (Stanford-Binet L-M). Academic achievement tests placed her within the top .001% of children her age in the nation.

According to her mother, since infancy, Jennie showed an extraordinary need for cognitive stimulation and a drive to assimilate academic knowledge. When this need was not accommodated environmentally, Jennie predictably responded with increased self-initiated activity and emotional disturbance.

Somewhere between the ages of 3 years 9 months and 4 years 6 months, Jennie experienced a cognitive leap in her capacity for abstract thought. Stanford-Binet L-M's administered at these two ages showed that at 4 years 6 months, Jennie was able to comprehend and respond appropriately to verbal absurdities abstract questions; whereas, at 3 years 9 months, she had not been able to do so. At the earlier testing, her abstract thinking revealed itself mainly through the simpler categorical and analogical questions. In addition, during the one-month segment of time following the second administration of the Stanford-Binet, the level of Jennie's independent reading selections jumped from second grade to fifth and sixth grade materials. This manifested cognitive growth was accompanied by a period of intense existential questioning and marked emotional turmoil.

The proposed paper is based on a case study of Jennie's development as reflected through interviews with her parents and with the clinical psychologist working with Jennie. Additional insight was gained through participant-observation in situations involving Jennie.

The qualitative data will be interpreted within a contextual theoretical framework provided by Lev Vygotsky. Vygotsky's concepts regarding environmental facilitation of the development of higher psychological processes (Vygotsky, 1981) fit strikingly well with Jennie's developmental pattern. From infancy, she sought external sources of stimulation, developing early interests in books, workbook activities and academic tasks. Accompanying her cognitive leap was an intense period in which Jennie verbally explored and reasoned out the world about her, assisted by her mother, whose aid she enlisted in her logical forays into existential phenomena. This particularly emotionally draining period for Jennie and her family concluded with Jennie's withdrawal into a period of self-involved thought, reading, and fantasy play. A Vygotskian-framed interpretation is that Jennie had succeeded in internalizing more complicated capacities for abstract reasoning (higher psychological processes) and was less in need of environmental facilitative input.

The emotional turmoil accompanying the development of Jennie's cognitive capacities will be discussed and interpreted phenomenologically. Jennie developed a capacity for abstract reasoning which normally is not expected until at least preadolescence. The meaning of this for Jennie was exemplified in the turmoil she experienced. We might conclude that she was experiencing a form of asynchronous development in which her rapidly developing cognitive capacities significantly outstripped her social-emotional development, resulting in emotional stress. This internal aspect of Jennie's giftedness produces a qualitatively different life experience for her than is the case for children with more average cognitive developmental trajectories.

The contextual and phenomenological views are presented as complementary to each other. Both are essential to a full understanding of gifted development. Questions for future research will be explored, and implications for contemporary views of giftedness will be addressed.

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SOCIAL SUPPORT SYSTEMS AND THE DISADVANTAGED GIFTED: A FRAMEWORK TO DEVELOP SPECIAL SERVICES AND PROGRAMS

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The critical role of parents in providing and coordinating resources for their talented child has been well-documented (e.g., Bloom, 1985). While helpful in understanding the talent development of middle class children, this research has not addressed economically disadvantaged gifted youngsters, whose circumstances usually lack significant resources. Within the field of gifted education, programs to help disadvantaged gifted students tend to focus narrowly on a single aspect of students' lives and deliver the same services to all students. This proposal describes a practical, individualized approach to talent development that draws on the concept of social support networks (Bronfenbrenner, 1979).

Social support networks are the individuals and institutions that exist within the various social spheres (school, family) of an individuals' life. These networks exert influence over the individual and are linked. Although individuals all relate to such networks, there is variation in the degree to which networks are supportive of individual growth and development. Supportive networks are those that contain members who provide emotional support and opportunities for the acquisition of values and competencies. Supportive networks have an articulation between the needs and abilities of the developing individual and the resources that can be provided by network members and institutions. Substantial development of an individual's potential necessitates particularly specialized and/or specially organized social networks and sets of social supports.

Key elements of a support system vary for different talent fields. A support system in the arts would include opportunities for exhibition or performance while one in an academic area would include opportunities for early advanced learning. Support systems also address the general social and emotional growth and development of the individual and might include for example, individuals that build self-esteem and opportunities to develop social skills.

Support systems vary with the circumstances of the talented individual. Individuals whose parents cannot create or coordinate supports may require a mentor while other more supportive families may need access to information about community resources. In addition, individuals may have unique needs that relate to basic subsistence or cultural expectations and attitudes. With this view, disadvantagement is a highly individualized phenomenon and cannot be dealt with a single or standard array of special services. And talent development is the process of creating and managing social systems that will support general development and systems that will develop specific abilities to a high degree.

A view of talent development which uses social support systems is more informative for purposes of assisting disadvantaged students. It requires an understanding of the key supports that are needed to develop abilities within a particular domain, an assessment of the presence or absence of those supports for a particular individual, an assessment of the individual unique needs, and the construction of an individualized program of support based on the student's needs, strengths and weaknesses. This approach yields programs that are comprehensive, integrated into the fabric of the student's life, and tailored to individual needs. This paper explicates the approach, describes two exemplary programs, and outlines a research agenda.

DEVELOPMENTAL APPROACHES TO ARTISTIC GIFTEDNESS

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Two studies done from constructivist perspectives will be presented and considered for their complementarity in understanding the development of gifted young artists and for their implications for future research.

A study of drawing development in children aged four, six, eight, and 10 (N=217) was conducted within a perspective which incorporates neo-Piagetian theory (Case, 1985, 1988) and a modular view of mind (Feldman, 1986; Gardner, 1983). Those children identified as gifted artists by a panel of judges did not demonstrate significant advancement when their drawings were analyzed structurally but did show significant differences on a number of specific artistic abilities such as figure drawing, color use, composition, and expressiveness. The universal/structural analysis provides the "big picture" of development (Fischer, 1980; Flavell, 1982), important for its age-related description of how knowledge of spatial relations in drawing is constructed and integrated. The addition of domain-specific skill analyses provides the "details" in the picture, important for their identification of exceptional drawing ability.

The second study was done primarily from a structuralist perspective but incorporated as well a post-formal perspective on the problem-finding and problem-solving behaviours of grade 9 through 12 young artists (ages 13-18; N=24). These young artists were nominated by their high school department head and faculty as students who both in performance and interest had the greatest potential for pursuing art as a career. Those students who were nominated using this criterion were, in the eyes of the faculty, gifted young artists. Several domain general measures of problem-finding and problem-solving were used as well as domain specific performance measures in art. The particular patterns of response were analyzed from a formal and post-formal framework. This developmental analysis reinforces the question of both within-stage and across-stage individual differences in the specific domain of art. The opportunity to make cross-domain comparisons with a parallel group of "gifted science students" led to several suggestions about linkages between domain general structural features of giftedness and domain specific performances.

Suggestions for future study include the issues of individual differences in developmental pathways (within-stage) and further theoretical integration of structural and modular views of mind. The studies also highlight the continued interest in what might be characterized as "developmental constraints" both across and within domains.

CHOOSING SCIENCE

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There has been concern among educators of the gifted that bright girls do not choose careers in science and math as often as their male peers. Research also indicates that many university science students do not intend to remain in science, and that the best women students are less likely than average students to continue in the field.

This investigation was undertaken to identify variables that could explain gender differences in the career plans of able male and female students. It was limited to university students in math and non-life sciences (physics, chemistry, biology, geology, meteorology), because these are the fields in which gender discrepancies are largest. The results of the first stage of the research will be reported, and current activity and future plans will be described.

Questionnaires were sent to undergraduates requesting information concerning students present program of studies, plans for work or study on completion of their first degree, and factors important to them in choosing a career. They were also asked to describe the reasons for success in science and nonscience courses, and to rate themselves from 1 to 7 on three sets of skills and abilities. Finally, follow-up interviews were carried out with 15 students.

Results showed few gender differences: Only among low-ability students were females more likely to plan to leave science, and there was one difference on career motives.

The interviews revealed that the women were at a disadvantage in the informal peer networks that help students cope with the pressures of study and finding work: Females were marginalized. They were similarly at a disadvantage in their informal relationships with professors. This already was having an impact on the ease with which they found jobs and the type of jobs that they found; it is likely that the disadvantage would be compounded as their careers advanced.

It became evident in the course of this research that few students make long-range career plans. Rather, they make one decision at a time, often not considering the long-term implications. Consequently, in order to get a better understanding of the process by which careers unfold, it has been decided to interviews students at a series of decision points, to find out the process by which decisions are made and the factors that influence them. This will be done using ethnographic decision-tree modeling which allows the researcher to develop a model of the process as understood by subjects. This approach was chosen as the most useful model for implementing change.

The first stage has been to interview undergraduate students to determine how they selected the program of studies that they are now pursuing. The first set of interviews have been completed and analysis will begin in the near future. The next step, currenly being planned for 1992, is to interview students who change their major, or drop out of university, to determine their reasons for change. In the future, secondary school students will be interviewed to determine the reasons that they consider in deciding what math and science courses to take.

SYSTEMATIC TRAINING OF EDUCATIONAL PROGRAMS FOR UNDERSERVED PUPILS

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Project Step-Up addresses one of the most crucial issues in gifted education, that of equity and the insufficient number of participants from minority disadvantaged groups in gifted programs. Several recent doctoral research studies: Sulkes (1986) and Rosselli (1988) have addressed the state-of-the-art in dealing with this issue and their research indicates that less than one half of one percent of Black and less than 1 percent of Hispanic and Native American children are referred or identified for gifted programs. In addition, all three researchers found that gifted programs of high quality and comprehensiveness correlated with size of school district and amount of funds available for general education. Minority disadvantaged students are not only not identified, but they are not referred to gifted programs. According to Armstrong (1988) part of the reason they are not referred is that they do not demonstrate the behaviors commonly thought of as being gifted behaviors.

An examination of commonly used referral checklists yields an Anglo oriented list of behaviors such as well developed vocabulary, advanced problem solving, wide fund of information and so on. Project Step-Up (Javits Grant funded by the Department of Education 1990-1993) has developed a research based observation instrument with behavioral characteristics of minority disadvantaged children including Hispanics, Native Americans and Blacks. Clusters of behaviors include social sensitivity, creative skills, communication skills, problem-solving, responsibility, sense of humor and psychomotor skills.

Project Step-Up is a regional effort involving the states of Texas, Florida, Arkansas and Arizona. Each state has three sites in which high potential minority disadvantaged students have been identified. The identification process consisted of teacher judgment using the minority disadvantaged checklist, peer judgment, student product portfolio performance, problem-solving tasks based on Howard Gardner's model and alternative testing including the Ravens Progressive Matrices and the Structure of Intellect tests. Each site selected 18 high potential minority students to become Project Step-Up participants in a full time learning situation. A comprehensive parent training component has also been developed to insure that the parents' are involved and committed to the project.

The teachers have been trained in a summer intensive session dealing with characteristics of minority disadvantaged, thinking skills, self-concept and creativity development. In addition, each site has also participated in on-site training from national consultants dealing with communication skills and integration of language arts with art.

Project Step-Up has as its major objective to chronicle a procedure and process to identify high potential minority children at the second grade level and to develop an alternative teaching-training process using computer hook-ups in which the children and the teachers can interact via modems in the four states. At the end of the three year project period the children will be tested using state approved gifted identification procedures that are required by the individual states. Project Step-Up hypothesizes that a minimum of 40% of the children will qualify on these instruments as gifted students. This session will concentrate on the findings of the first year dealing with the identification and teacher training component.

PRECOCITY IN LANGUAGE AND ITS PREDICTIVE SIGNIFICANCE

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A five-year longitudinal study followed a group of toddlers who had been identified as precocious in expressive language. Twenty-eight children were initially followed intensively from ages 20 to 30 months; 25 were seen once again at age 54 months; and 21 were seen for a final visit at age 6 1/2 years. The following questions were addressed: 1) Can parents accurately identify such children? 2) Is early verbal precocity coherent and is it distinct from other domains of development? 3) Does such precocity require a specific acquisition style? 4) Do verbally precocious toddlers retain their verbal advantage over time? 5) Does verbal precocity presage precocity in reading? 6) Does it presage eventual reading competence?

From a pool of toddlers nominated by their parents, 49 children were screened at 20 months on the basis of reported 18-month vocabularies of 200+ words and/or frequent three-word sentences. From these 49, we identified 30 toddlers whose language performance in vocabulary, grammar, or Bayley Language Subscale met a criterion of at least +2 s.d. A broad variety of psychometric measures, observational measures (including a home visit at age 20 months), and parent report, were utilized over the five-year period. The findings can be summarized briefly.

(1) Correlations at 20 months between parent report (using a precursor of the MacArthur Communicative Inventory: Toddlers) was high for both vocabulary (r=.63 with Bayley Language Subscale) and grammar (r=.59 with MLU).

(2) Correlations within the verbal domain on measures such as Stanford-Binet (Forms L-M and IV), Peabody Picture Vocabulary Test, and Mean Length of Utterance were substantially higher than those across domains, although overall the children were advanced in mental ability (e.g., Bayley MDI_{20}=141; Stanford-Binet L-M IQ_{30} 30=138).

(3) Some toddlers used a more "social" style of language expression, while others were more "analytic."

(4) Verbal precocity did indeed remain significant, despite some regression. For example, while the mean PPVT-R age equivalent was 36.6 months at age 24 months, and 50.3 months (standard score+128) at age 30 months, mean PPVT-R performance was 74 months (standard score=122) at 54 months of age. Yet, even at the final visit, the children's mean Stanford-Binet IV Vocabulary standard score was still an impressive 65.5 (equivalent to IQ=131).

(5) At age 4 1/2, they were not early readers (only one read at the second grade level; only three read >1 word on the Peabody Individual Achievement Test). Measures of concepts of print and of phonological awareness provided more sensitive measures of emergent literacy. Engagement in a story-reading episode at 24 months was a moderate predictor of reading

competence at 54 months, as was the amount of parental instruction in literacy in the interim.

(6) Finally, when the children were ready to enter first grade (mean age=78 months), most were reading with advanced competence (mean Woodcock-Johnson Letter-Word Identification standard score=120.3, Passage Comprehension=117.9). Thus, although verbally precocious toddlers give promise of a positive developmental trajectory, we will have to look elsewhere for early readers.

THE RELATIONSHIP AMONG PROBLEM FINDING, PROBLEM SOLVING, COGNITIVE CONTROLS, PROFESSIONAL PRODUCTIVITY, AND DOMAIN OF PROFESSIONAL TRAINING IN ADULT MALES

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An exploration of the relationship among problem finding, problem solving, cognitive controls, and professional productivity in artists and scientists offers the potential of additional insight into manifestations of giftedness and implications for appropriate educational intervention.

Eighty adult male subjects, assigned to groups based on their domain of expertise (art or science) and their professional productivity (critically acclaimed producer or professionally competent), were videotaped while being given three measures of problem solving, three measures of cognitive control, and three activities involving problem finding as well as problem solving.

Three cognitive ability measures, published by the Educational Testing Service, were used as measures of problem solving involving well-defined verbal-comprehension, logical-reasoning, and spatial visualization tasks.

The three ill-defined problem-solving tasks involving problem finding were Westcott's intuition task and two puzzle-type games that involved manipulation. The two games ("Pablo" and "Marble Rollers") were scored on process variables derived from the work of Getzels and Csikszentmihalyi.

Three measures of cognitive controls were administered. Equivalence range was measured by the Object Sorting Test, in which subjects are presented with an array of objects and are asked to group them physically in any manner they find comfortable. The Hidden Pattern Test was used as a measure of field articulation and the Leveling-Sharpening House Test was employed to assess leveling-sharpening.

Verbal responses were elicited from the subjects as the videotapes were reviewed, and questions were asked regarding the session and the subjects' descriptions of real-life decision-making processes.

A multivariate analysis of variance, followed by univariate analyses, was performed in order to test for group differences on the measures of problem finding, problem solving, and cognitive controls. Critically acclaimed professional producers in art and science were differentiated from professionally competent artists and scientists on two problem-finding tasks and one measure of cognitive control.

The professionally productive adult males devoted a larger proportion of their total response time to finding a problem in a decontextualized task (Marble Rollers) showed greater efficiency in the successful use of clues in a problem-solving task involving problem finding (Westcott Scale), and utilized

a larger proportion of abstract functions on a sorting task (Object Sorting Test).

Chi-square tests of homogeneity revealed group differences with respect to the types of constructions created on one of the problem-finding tasks, the strategy used in the Paper Folding Test, and the responses regarding attitude toward taking chances.

Conclusions and educational implications are drawn based on a three-dimensional conceptual model of problem situations that depicts the relationship between the differentiating variables. The dimensions of the conceptual model are described in terms of variables associated with problem formulation, method formulation, and solution formulation. Limitations are described and recommendations are made for further research.

PROJECT 7+--APPLYING HOWARD GARDNER'S THEORY OF MULTIPLE INTELLIGENCES

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Community School District 18 in Brooklyn, New York was funded by the United States Department of Education under the Jacob K. Javits Gifted and Talented Students Education Act to develop a demonstration project that would explore ways to identify and provide appropriately differentiated curriculum for students that are usually not identified as gifted through the use of traditional assessment methods. The theoretical foundation for District 18's project, the Javits 7+ Program, is Howard Gardner's Theory of Multiple Intelligences. District 18 created an early childhood program designed to discover and develop multiple intelligences identified by Gardner's research. Under the leadership of Joyce Rubin, Director of Gifted Programs, a team of teachers and supervisors developed a series of intelligence-fair performance based assessments that are engaging and enjoyable for the child and informative for the adults who interact with the child. This approach stresses the notion of assessment as an ongoing process, the necessity of previous exposure to materials, and the importance of a meaningful context in which the assessment takes place.

For each assessment there are two phases: *experience* and *performance*. During the *experience* phase, it is essential for the children to have exposure to and become familiar with the materials that will be used to assess their *performance*.

The project director conducts staff development workshops for all kindergarten teachers where the supportive materials are introduced and the administration of the assessments is modeled.

At additional workshops, curriculum specialists provide the teachers with a variety of strategies (such as using learning centers and contracts) to individualize instruction. Supervisors, teachers and visual and performing artists work collaboratively to create a supportive learning environment, which values all intelligences equally, and enables students to recognize and appreciate their own uniqueness and that of their peers. Interdisciplinary units of instruction provide opportunities for students to develop their multiple intelligences as well as their critical and creative thinking skills.

Because parents are partners in the education of their children, workshops are provided enabling parents to develop strategies which nurture their children's multiple intelligences at home.

PSYCHOSOCIAL DEVELOPMENT AND THE GIFTED UNDERACHIEVER: CASE STUDY EXAMPLES

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Although cognitive development has been widely explored in the areas of giftedness and underachievement, psychosocial development has been given less attention. The disciplines of education and psychology seem to be strangely isolated from each other in regard to this issue. More children are brought to psychologists and counselors because of poor school work than any other problem; yet educators are only recently beginning to address underachievement as a psychosocial problem in addition to a cognitive, learning or neurological problem. Rimm (1986), with her Trifocal Model, speaks a great deal about intrapsychic and family issues as generative in the underachievement syndrome and implies a developmental process: "Let's look at those early symptoms of later problems" (p. 23); but she stops short of conceptualizing these issues in a developmental framework. Predictably, her interventions lack a unifying framework, though from a practical standpoint her work has a great deal to offer. She acknowledges such by saying, "Therapy conducted at the clinic is not theoretical but is practical and based on real life problems in our homes and schools." (p. xi-xii)

Work by Pecaut (1979) and Mandel and Marcus (1988) present developmental models from which to view underachievement, and both do so with a clear intent of linking theory to therapeutic practice in remediating underachievement. The underlying assumptions are that personality development follows an orderly progression in which certain basic needs must be met. If these needs are not met, the child becomes fixated in a particular stage of development. It follows then that certain patterns and styles of behaviors associated with underachievement are correlated with certain fixated positions or "stuck points." Remediating underachievement thus depends on assisting the student to resolve the issues associated with a particular stage of psychological development so that further growth can take place.

Pecaut, Mandel and Marcus do not specifically identify in which ways gifted children might vary from nongifted, however, both acknowledge that underachievement occurs more frequently in higher ability children than in those of average ability. Rimm (1986) devotes more attention to these differences.

This paper will outline these two developmental models as they relate to underachievement and attempt to synthesize these models with Rimm's work. Also suggestions will be offered regarding ways in which the models can be utilized to understand the unique ways that gifted children may be affected by developmental events which interfere with high achievement. Case study examples from a private practice setting will be included to illustrate the concepts of psychosocial development and underachievement. In addition, counseling interventions used with these youngsters will be specified with references to the developmental theory components which guided the interventions.

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RESEARCH IN PROGRESS: DEVELOPMENT OF GIFTEDNESS IN THE MULTI-AGE, MULTI-ABILITY PRIMARY SCHOOL

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While others have considered the developmental nature of giftedness itself, this research in progress approaches the topic from a somewhat different angle: How a developmentally appropriate education program in the early hears can affect the development of giftedness in children. Among the major reforms mandated statewide in Kentucky in 1990 was the call to establish "ungraded primary schools" for children in grades K-3 by the beginning of the 1992-1993 school year. Critical attributes that define the focus of the ungraded primary schools are: Developmentally appropriate practice; multi-age/ability classrooms; continuous progress; authentic assessment; qualitative reporting methods; professional teamwork; and parental involvement.

The ungraded primary is based on the belief that children develop at different rates and that a developmentally appropriate curriculum, spread over four years, will maximize success for a greater number of students. This contrasts with what some see as the current lockstep system that retains some children, declaring them failures, and limits the growth of others by assuming all children should be at a certain curricular level by the end of a given school year. Some parents and teachers have concerns about whether children's needs, particularly older students', will be met in the multi-age, multi-ability primary setting. Others see it as an opportunity to expose children to higher expectations and more challenging teaching methods and curriculum. The more open-ended and challenging curriculum demanded by the primary program should contribute to the identification of gifted students, particularly those not identified by more traditional measures, and may indeed contribute to the development of giftedness in a greater number of students. It is the intent of the study to examine the way in which the critical attributes are implemented and the extent to which existing positive expectations and concerns are realized as theory moves into practice.

This year-long study examines academic, intellectual, social, and emotional outcomes for students in the first year of an ungraded primary school. Because some students had been in ability-grouped classes the previous year, the study also documents the first year of heterogeneous groupings. Subjects include all "first" and "second" grade students (approximately 265) and their eleven teachers in the pilot year of an ungraded primary program in one school. Qualitative research methods are being used and data will include: sociograms; field notes of interviews with teachers, students, and parents and of classroom observations; standardized test scores; and student products. In particular, case studies are being done on eight students across the two teaching teams; four students who had been previously identified as gifted (two older and two younger), two learning disabled, and two comprehensive ("regular"). The session will report results to date and invite discussion about both results and future directions for the research.

PERCEPTUAL FLEXIBILITY IN ARTISTS AND NONARTISTS ACROSS DEVELOPMENT

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Do artists see the world differently than we do? Can we develop measures of perceptual ability that truly capture differences between artists and nonartists? How do such differences in perceptual ability between artists and nonartists relate to traditional measures of individual differences such as field independence-dependence? Finally, and most importantly, what is the developmental progression of these differences in perceptual ability? The current research in progress attempts to answer these questions by (1) developing novel measures of perceptual flexibility using established classification paradigms used to differentiate the holistic representation and processing of integral objects and the analytic representation and processing of separable objects, (2) employing such novel measures of perceptual flexibility with children at different ages in order to characterize the developmental progression of perceptual flexibility, (3) relating perceptual flexibility (based on classification performance across development) to field independence-dependence by employing Witkin's embedded figures test (EFT), and to drawing performance measures, and (4) evaluating attentional flexibility and field independence-dependence in children and adults identified as gifted in the visual arts.

Our goals are to be able to first, evaluate and characterize differences in the perception of the visually-gifted artists and nongifted, and second, contrast patterns of perceptual development in the visually gifted and nongifted. In terms of the project's goals, items (1), (2) and (3) are near completion.

ACADEMICALLY GIFTED CHILDREN AS HIGH PERFORMING OUTLIERS ON A BATTERY OF COGNITIVE TASKS: IMPLICATIONS FOR MORE EFFECTIVE IDENTIFICATION OF GIFTED MINORITY STUDENTS

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This paper is concerned with the identification of intellectually/academically gifted children. Their detection from within mainstream society has encountered little difficulty. In sharp contrast, the identification of giftedness among children whose first language is not English, and/or who are raised in economically disadvantaged or culturally different families, has posed a problem that is yet to be successfully addressed. The numbers identified from these groups are often so far below the prevalence of those same groups in the school system as to suggest something drastically wrong with the assessment tools and/or criteria required for a classification of gifted. New, more effective identification measures are called for.

However, if one is attempting to identify the intellectually gifted, and we agree that this group represents only one of several gifted groups, one must not sacrifice predictive validity, as measured by school performance, in order to increase the numbers of minority children placed in gifted programs. It seems to us that it is critical to develop a test for the identification of intellectually gifted children that: 1) assesses those characteristics that are associated with high academic achievement; 2) is valid for children who are raised in these cultural; and/or language different families; and 3) identifies as gifted a greater percentage of children from minority groups.

We have begun a project whose aim is to incorporate all of these characteristics. Regarding the first component, we are currently evaluating cognitive tasks in order to determine those tasks which distinguish between children who are or are not gifted. It is our belief that children who perform exceptionally well on cognitively demanding tasks will also do well in school and so we have chosen the demonstration of high cognitive performance to identify our intellectually/academically gifted students. Our first studies have included White/Hispanic and White/NonHispanic children. "Good" tasks, those to be included in the cognitive battery, would be those associated with no or minimal ethnic differences, the discrete separation of nearly all the gifted children from nearly all of those not in the gifted program, and the isolation of no more than five or ten percent of the children not currently in gifted programs as high performing (potentially gifted) outliers.

With respect to the second and third components, we expect to create a test which is also valid for different cultural and/or language groups. We plan to vary the specific stimuli eliciting the cognitively demanding responses so that these are culturally meaningful for the children to be tested, e.g., if eliciting taxonomic exemplars, use categories that will be familiar to the particular group. We will also ensure that when a specific

name is critical to determining the accuracy of a response, as in a recall task, that the particular items do elicit only a single name in the child's language. Finally, we plan to develop the test and instructions so that the test can be administered and the children can respond in any of several languages. Initial results will be presented. The use of such a battery as a more effective screening device or as an alternate assessment test will be considered.

IDENTIFYING GIFTED CHILDREN: THEORY AND PRACTICE, URBAN AND RURAL CONCERNS AND DIFFERENTIAL DISCIPLINE PERSPECTIVES

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The identification of gifted children has received increasing amounts of attention over the past decade. Newer theories of giftedness have emanated, newer approaches to the construct of intelligence have evolved, and new intelligence tests have appeared.

However, there are differences in theory of identification as opposed to reality. Sadly, the average parent and teacher is not trained or involved in the identification, or if involved, they are marginally literate in the domains necessary for this task.

This panel will address the identification of gifted children from several perspectives. First, the theory of identification, particularly across paradigms will be addressed. Three paradigms will be explored--the endogenous, the exogenous and the constructivist paradigm. Secondly, the reality of identification and service from an administrative perspective will be addressed. Thirdly, the newer perspectives from a theoretical point of view will be combined with newer intellectual assessment techniques. Lastly, more progressive attempts to assess, evaluate and identify exceptional ability across disciplines and subject areas will be addressed.

The panel will explore the concerns of parents, teachers and counselors relative to the mentoring of gifted children from a developmental perspective and the nurturing of specific skills and abilities.

PROBLEM FINDING AS A KEY TO EXCEPTIONAL ABILITY: A RESEARCH PROPOSAL

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Individuals of exceptional ability have been identified in a variety of ways throughout social and educational history. Diverse cultures have recognized individuals whose abilities met society's needs or added to the quality of life for a given group. Navigators, inventors, mathematicians, storytellers, politicians, musicians, scientists, dancers and theologians all may be identified as exceptional in their abilities to contribute to the world around them. Educators and psychologists, hoping to identify and nurture exceptional abilities, have developed standardized assessment instruments ranging from generalized assessments of intellectual abilities to highly targeted tasks. Recent trends in assessment have encouraged the addition of more holistic measures, including portfolios and performance based assessment, in which the tasks analyzed are increasingly complex and more similar to achievements for which individuals are identified in society at large (e.g., Resnick & Resnick, 1989; Shepard, 1989).

Despite this increasing trend toward authentic problem solving in evaluation, few efforts have examined variation in individuals' ability to identify and target problems worthy of solving. How do individuals choose the experiments to conduct, literary themes or navigable channels to explore, images to apply to canvas or stories to develop through dance? The process of identifying and focusing a problem has been called problem finding. Described by Dillon (1982) as "a process resulting in a problem to solve," problem finding has been investigated in disciplines as diverse as art (Getzels & Csikszentmihalyi, 1976), writing (Moore, 1985; Starko, 1989), science (Subotnik, 1986) and thinking skills (Wakefield, 1985). It has been added as a stage ("Mess Finding") in creative problem solving (Isaksen & Treffinger, 1985) and a talent in the multiple talents model (Taylor, 1986). It has been recognized by theorists as a key theme underlying creativity and intelligence (Perkins, 1981; Sternberg, 1985). However, few efforts have been made to examine problem finding as it relates to the identification of exceptional ability, or as it might emerge developmentally.

This paper will review literature on problem finding and suggest questions for future research. Issues to be examined include: Distinctions between problem finding and problem solving parallels in problem finding across disciplines examination of the development of problem finding in children consideration of problem finding as a factor in identification of exceptional abilities possibilities for nurturing or assisting problem finding, with implications for teacher education. While the limited research base makes it likely that many of these issues will result in more calls for research than definitive conclusions, it is hoped that the review may provide a place to begin.

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PERCEPTION OF COMPETENCE OF ACADEMICALLY TALENTED BOYS AND GIRLS

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Objectives

Adolescents' conceptions of self have been studied in a variety of forms (e.g., self-concept, self-esteem, and perceptions of competence), with adolescents in general (e.g., Marx & Winne, 1978) and academically talented youngsters in particular (e.g., Janos, Fung, & Robinson, 1985). Some studies suggest that the dimensions of self-concept may vary with gender (e.g., Byrne & Shavelson, 1987) or gender role orientation (e.g., Wells, Peltier & Glickauf-Hughes, 1982). Such studies have suggested differing perceptions of competence within academic domains for boys and girls (Kramer, 1991; Ryckman & Pekcham, 1987).

This study examines the perceptions of competence academically talented girls and boys hold in comparison with peers of the same and opposite gender. Perceptions of competence are important in maintaining motivation toward a given goal (Ford, 1987), and studies have suggested that perceived competence in a given area predicts future achievement in that area (Stevenson & Newman, 1986).

Method

Subjects

Subjects selected through the Duke University Talent Identification Program Talent Search. Students scoring at or above the 97th percentile on a standard in-school achievement test are eligible to participate in the Talent Search. Three-thousand of the approximately 57,000 Talent Search applicants (1000 each White males and White females and 500 each non-White males and females) were selected for this project. The 1145 (38.2%) who completed questionnaires served as subjects for this study.

Instrumentation

The Talent Search Questionnaire (TSQ) is comprised of two separate questionnaires, one each for students and parents. One section of the Student Form of the TSQ includes two sets of items, one asking for comparisons with *girls* the subject's age, and the other asking for comparisons with *boys* the subject's age.

Students rated their competence in twelve different contexts (English/writing, Athletics, Leadership, Social Studies, Computer Programming, Vocational skills, Mathematics, Foreign language, Art/music, Home Economics, Science, School in general) according to the following scale: A = Better than most girls my age; B = About the same as most girls my age; C = Not as good as most girls my age; D = I don't know. For the second set of items, "girls" is replaced by "boys." (For example, A = Better than most boys my age).

Procedure

Questionnaires were mailed out in early February and returned by mid-March. Students' participation in this project was independent of any other TIP involvement.

Analysis and Results

Preliminary analyses indicate that in English/writing, girls rated themselves significantly higher than boys did in comparing themselves to other girls [mean (girls) = 1.44, mean (boys) = 1.74; $p < .005$] and to other boys [mean (girls) = 1.23, mean (boys) = 1.42; $p < .005$]. Significant differences were also found for Athletics, Leadership, Computer Programming, Art/Music, and School in General. No differences were found in the self-ratings for either gender in comparison with other girls or boys in Social Studies, Science, or Mathematics.

Discussion

Meece, Parsons, Kaczala, Goff, and Futterman (1982) have suggested that even though elementary school girls and boys so not have differing self-concepts in math, patterns vary with gender during high school. Because these students are in middle or junior high school, their responses will be especially informative about the development of perceptions of competence in these domains. These results are particularly important because relatively little is known about the perceptions of competence of this very able group of students, particularly as these perceptions may vary with gender.

CREATIVITY TESTS AND ARTISTIC TALENT

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The ability of creativity tests to predict artistic performance has often been questioned. In what way must creativity tests be constructed to predict artistic performance? What procedures can programs for the gifted and talented now employ to identify artistically talented individuals? The following longitudinal study was conducted to address such questions.

Method

The subjects of this small, exploratory study began as 23 fifth graders of average and above academic aptitude. As a group, they took an achievement test (on which 74% scored one year or more above the national mean grade placement) and the Group Inventory for Finding Creative Talent (on which 8 met the criterion of creative giftedness). They drew pictures for a generic theme which were ranked for artistic merit by the head of the University art department and a graduate art student (r_s, = 77). Two graduate students each administered half of the subjects three WISC-R subtests, a composite measure of divergent thinking, and an experimental measure of creative thinking (two invented problems on the divergent-thinking exercise). As a follow-up a year later, the subjects were administered the ACT Interest Inventory. At the end of eighth grade, 18 were administered this inventory again. At the end of eleventh grade, the parents of the two subjects with the most artistically meritorious drawings in fifth grade were briefly interviewed.

Results

Intercorrelation of scores from the measures administered in fifth grade revealed that although several types of test scores correlated significantly with each other, only one of these scores (the experimental measure of creative thinking) correlated significantly with artistic merit of drawings (N = 23, 4, = .38, $p < .05$). The Group Inventory for Finding Creative Talent, the experimental measure of creative thinking, and artistic merit of drawings all predicted interest in the creative arts one year later, but only artistic merit was a robust predictor (N = 19, r_s = .59, p, < .01). None of the fifth-grade measures predicted arts interest in eighth grade except artistic merit of drawings (N = 18, r_s = 45, $p < .05$).

Six years after the original testing, the parents of 2 subjects with highly meritorious drawings w3re contacted by phone. The interviews revealed that the subject whose drawing had ranked first had subsequently undergone three years of training in visual arts. The child whose drawing had ranked second had developed interests in verbal expression, winning a citywide essay contest sponsored by the local newspaper (c. 120,000). Both were planning to enter college upon high school graduation.

Discussion

This small, longitudinal study found that only one measure of creative thinking correlated with artistic merit of drawings, and artistic merit of drawings was a better predictor of later interest in the arts than any creativity test score. Implications are discussed for future research on creativity tests, and for early identification of artistic talent through assessment of artistic performance.

Gf-Gc THEORY AND THE COGNITIVE ASPECTS OF EXCEPTIONAL ABILITY

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Individual differences in exceptional ability are examined from the perspective of Gf-Gc theory. The Gf-Gc theory of cognitive processing has derived over the past 50 years out of the work of Raymond Cattell and John Horn. Based on hundreds of factor analysis studies conducted with humorous published and unpublished sets of tests, it is the major empirically-based theory of multiple intelligence available. Eight broad cognitive abilities, presently identified in the theory, are described and related to the concept of giftedness: Comprehension-Knowledge (Gc), Quantitative Ability (Gq), Novel Reasoning (Gf), Associational Memory (Glr), Visual Processing (Gv), Auditory Processing (Ga), Short-Term Memory (Gsm), and Cognitive Processing Speed (Gs).

Gf-Gc theory is compared to Howard Gardner's theory of multiple intelligences. The two theories are shown to be views of the same phenomenon from different perspectives, not alternative theories. Whereas, Gf-Gc theory is concerned primarily with relatively distinct abilities (common factors) studied by factor analytic procedures, Gardner's multiple intelligences represent areas of human expertise each of which requires different combinations of Gf-Gc abilities. Such complexes of abilities are typically studied by procedures such as multiple regression.

In contrast to the potential value of Gf-Gc theory, the concept of general intelligence is questioned as a useful construct in the identification of exceptional ability. In conclusion, some developmental aspects of Gf-Gc abilities are illustrated by Rasch-scaled charts of cross-sectional data showing relative growth and decline patterns in over 6000 age 2 to age 90 subjects.

THE ROLE OF THE DEVELOPMENT OF RELATIVISTIC THINKING IN IDENTIFYING ADOLESCENTS OF INTELLECTUAL PROMISE

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Relativistic thinking has recently been examined in three ways. In philosophy, whether defended (i.e., Doppelt, 1982) or attacked (i.e., Gellner, 1984), cultural or moral relativism is approached as a possible advance in intellectual activity. In cognitive psychology, two somewhat different directions each lead to the study of the development of the ability to reason relativistically. Intellectual descendants of Piaget's work (see Commons, Richards, & Armon, 1984) found relativistic thinking to be a postformal ability occurring in adulthood (Benack, 1984, 1988; Sinnott, 1984, 1989a, 1989b) while Perry 1970; 1981) theorized and empirically supported relativism as intellectual growth which takes place sometime during the college years. Thus, findings support that relativistic thinking, if it occurs, develops after the teen years.

An implication of the above findings is that if an adolescent is able to think relativistically, she or he may be cognitively advanced or intellectually gifted. Empirical support for this comes from a recent study by Wilkinson and Schwartz (1987) who tested sixteen 12 to 15 year-olds with SAT scores at least 1.5 standard deviations above the mean. Analyses of the young teens' scores on Perry's scale of dualism/relativism revealed that these gifted adolescents did hold relativistic beliefs.

In the present proposal, the presence of relativistic thinking will be examined as in indicant of cognitive giftedness in adolescents.

Subjects--Forty junior high and high school students from suburban Texas school systems will be matched across four groups for gender, SES, educational level and ethnicity. The four groups of ten teens each will be: 1) 12-14 year-olds identified through the school system as gifted; 2) intellectually average 12 to 14 year-olds; 3) gifted high schoolers 16-18 years old; and 4) cognitively average older teens.

Measure and Method--Multiple measures will be used to determine the presence of relativistic thinking: 1) The Preformal, Formal, Postformal-Relativistic Test (PFPR Test), a multiple-choice answer questionnaire for determining cognitive development (Worthen, 1991b) and 2) two open-ended paragraphs describing real-life paradoxical situations (see Worthen, 1991a) to which teens will respond in writing.

Analyses of Hypotheses--Scores on the questionnaires and judge's ratings of teens' responses to the paragraphs will yield three samples of each adolescent's level of thinking. Chi square analyses (N=120) will be used to verify three predictions: 1) Gifted adolescents of both age groups combined will produce more relativistic responses (stage/level three) than average students of both age groups whose responses are predicted to be preformal (stage/level 1) or formal (stage/level two). 2) More responses of gifted

younger teens will be formal (stage/level two) or relativistic (stage/level three) that will be the responses of average younger teens who are expected to produce preformal (stage/level one) responses. 3) More responses of gifted older teens will be postformal-relativistic (stage/level three) than will be the responses of average older teens who are expected to produce formal (stage/level two) responses.

Support for these hypotheses comes from both the Piagetian literature (see Bower, 1979; Inhelder & Piaget, 1958; Piaget & Inhelder, 1969) which indicates that as mid-adolescence formal abilities develop, and from Perry's work (see Perry, 1970, 1981; Leadbeater & Kuhn, 1989) beyond adolescence. In past research, younger teens are expected to be preformal operational and older adolescents are predicted to be formal thinkers. Normal adolescents are not predicted in neither the Piagetian nor Perry tradition to be relativistic, postformal or beyond formal operational.

In summary, the proposed research project seeks to show that identified gifted adolescents think relativistically. An implication of this finding would be that teens who display relativistic thinking as measured by the PFPR questionnaire and by production of reasoning responses to real-life situations would than be candidates for being identified as cognitively gifted whether or not they have been so identified by other methods. In conclusion, a teen who thinks relativistically must may be at promise for cognitive giftedness.

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IDENTIFICATION OF GIFTEDNESS AMONG CHILDREN WITH HANDICAPS

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This proposal is submitted under category 3: Critical reviews of the literature with implications for research. Fifty-two publications in the emerging field of handicapped gifted form the basis for the review.

There are many historical examples of highly gifted individuals who have overcome handicaps to make contributions to society for example, Helen Keller, Thomas Edison, Itzhak Perlman. It is not known how many more have been unable to transcend disability because of unidentified potential and/or inappropriate schooling. It is estimated that 2-5% of individuals with handicaps are gifted.

There is general agreement in the literature on handicapped gifted that modification of the screening and identification procedures commonly used with gifted children is required in order to increase the likelihood of recognizing potential gifts and talents among handicapped students. These modifications include comparison with like-handicapped peers, not with the general population of gifted learners or non-handicapped students; modification of test situations to make it possible for handicapped students to respond without bias to their true ability; and greater emphasis on characteristics instrumental in successful compensation for the handicapping condition. It remains to be shown through documented research, however, how these modifications are best applied within specific areas of handicap.

The literature suggests strongly that the child's teacher is a vital part of the identification procedure and that identification is enhanced with increased teacher familiarity with the characteristics of giftedness. Teachers who are sensitized to the ways in which handicapping conditions can impede the expression of characteristics indicative of giftedness can seek out alternate modes of assessing superior qualities of thought. Instead of oral and written language, for instance, non-verbal tasks requiring problem solving, critical thinking, creativity, superior memory may be used as indicators. There is no clear indication in the literature, however, of what these tasks might be or how they might be administered and evaluated. Development of such instruments for use with gifted children with handicaps would provide invaluable assistance to practitioners working with these children.

The literature also suggests that the identification process should include multiple sources of information: standardized tests of intelligence and achievement, checklists, anecdotal records, teacher and parent nominations, and so forth, with the cautionary proviso that all of these sources require careful evaluation to determine whether they are indeed appropriate for a particular student. Some specific suggestions culled from the literature include involvement of an examiner with a handicap similar to that of the student, lowering IQ cut-off requirements, de-emphasizing

achievement scores, and using a dynamic, interactive assessment procedure. None of these suggestions have been validated by research.

A number of empirical studies on distinguishing characteristics of giftedness among children with handicaps are reported in the literature. The majority focus on patterning of WISC-R sub-test scores in gifted children with learning disabilities. One study deals with intellectual, academic, and motivational characteristics of gifted children with hearing impairment. Several others report on screening instruments developed for gifted preschool children with handicaps. Many additional studies are required to replicate findings and generalize results to other subpopulations.

In summary, the education of gifted children with handicaps is a very broad field, which is just emerging from its "frontier" phase, particularly with reference to gifted learning disability. Publications dealing with the topic "handicapped gifted" tend to focus on general issues and guidelines, while articles on discrete sub-populations tend to report specifics regarding identification procedures. Thus, the educational impact of the field is found within very specific types of handicap. It remains to be shown that procedures developed within one subpopulation, such as hearing impairment, are transferable to other groups.